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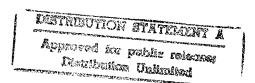


JPRS Report

Science & Technology

Japan

SURVEY REPORT ON RESEARCH ACTIVITIES
IN PRIVATE ENTERPRISES



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SCIENCE & TECHNOLOGY JAPAN

SURVEY REPORT ON RESEARCH ACTIVITIES IN PRIVATE ENTERPRISES

92FE0584A Tokyo SCIENCE AND TECHNOLOGY AGENCY REPORT in Japanese Feb 92 pp 1-139

CONTENTS

III.	Outline of Survey	1
	1. Outline of Survey	1 1 2 2
II.	Sales, R&D Expenditures, Number of Researchers, Etc	3
	1. Sales	3 3 4 5 5
III.	Summary of Survey Results	6
	 Perception of International Situation in Relation to S&T State of Globalization of Private Enterprises' R&D Activities. State of Globalization of R&D Strongpoints in Japan Making Rules To Facilitate the Activities of Private Firms 	6 10 24 34
IV.	Aggregate Results of Survey (Summary)	40
٧.	The Questionnaire	106

Survey Report on Research Activities in Private Enterprises

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[Text] I. Outline of Survey

1. Outline of Survey

In recent years, Japan's rise as an economic power has been astounding, and its international influence that is attendant upon that grows stronger. On the other hand, though, the international environment surrounding Japan has become increasingly more fierce, as shown in the trend of rising trade friction.

In such a situation, an important issue for Japan is to endeavor to raise S&T levels through continued strengthening of its basic research, and to aim for the creation of S&T results that can become international contributions.

In this the R&D activities of private enterprises, which account for about three-fourths of the money used in Japan for research, become increasingly important. In recent years, many private enterprises—more so than in the past—are emphasizing R&D activities. They are seen as playing an even greater role in raising the level of Japan's S&T and in producing international research results. In this sense, the structure of private enterprises' R&D and its changes are gaining attention.

While continuing to keep these things in mind, our intentions in carrying out this survey are that it will grasp the actual state of affairs in the globalization of private enterprises' R&D activities, and that it will be of use in drawing up and promoting future S&T policies.

2. Subjects and Method of the Survey

The subjects of this survey were private enterprises (1,301 companies) with at least ¥1 billion in capital that carry out R&D activities. We conducted a questionnaire survey by mail.

3. Period of the Survey

We carried out the survey in June 1991.

The figures reported in the survey for amount of capital, number of employees, and number of researchers were as of 31 March 1991. Those for sales and R&D incomes and expenditures were for FY90, and all other figures were those at the time the questionnaire was filled in.

4. Responses to the Survey

Of the 1,031 companies to which we sent the survey, 852 companies responded (65.5% recovery rate), and 831 companies provided valid responses (63.9% valid response rate). Tables 1 and 2 show the breakdowns of the enterprises that provided valid responses by type of industry and by scale of capital.

Table 1. Breakdown by Type of Industry of Enterprises Providing Valid Responses

Responses				
Type of industry	831 enterprises			
1) Agriculture, forestry, and fisheries	5			
2) Mining	4			
3) Construction	82			
4) Food processing	50			
5) Textiles	26			
6) Pulp and paper	19			
7) Printing and publishing	3			
8) Synthetic chemicals	62			
9) Oils, fats, and paints	11			
10) Pharmaceuticals	38			
11) Other chemicals	35			
12) Petroleum and coal products	18			
13) Plastic products	18			
14) Rubber products	6			
15) Ceramics	32			
16) Iron and steel	36			
17) Nonferrous metals	30			
18) Metal products	23			
19) Machinery	64			
20) Electrical machinery and appliances	84			
21) Communications, electronics, and electrical	39			
measuring instruments	47			
22) Automobiles				
23) Other transport machinery	18			
24) Precision machinery	24			
25) Other industries	14			
26) Transportation, communications, and public	26			
utilities				
27) Other types of industries	17			

Note: Synthetic chemicals indicate chemical fertilizers, inorganic chemicals, organic chemicals, and chemical fibers.

Table 2. Breakdown by Scale of Capital of Enterprises Providing Valid Responses

Scale of capital	831 enterprises
1) ¥1~5 billion 2) ¥5~10 billion 3) ¥10~50 billion 4) 50~100 billion 5) More than ¥100 billion	308 199 240 45 39

II. Sales, R&D Expenditures, Number of Researchers, etc.

The following is an outline of the FY91 sales, R&D expenditures, number of researchers, etc., of the 831 companies that provided valid responses to the survey.

1. Sales

The total amount of FY91 sales of the enterprises that responded to the survey was \$207.7555 trillion. By type of industry, the automobile industry had the largest sales (\$29.7589 trillion). That is followed by the electrical machinery and appliance industry (\$26.36 trillion); transportation, communications, and public utilities (\$25.6313 trillion); and the construction industry (\$24.7889 trillion).

2. R&D Expenditures

R&D expenditures in FY91 were \$7.4022 trillion in total and \$8.9 billion per company.

By type of industry, the largest amounts spent for R&D per company were those by the automobile industry (\$23.1 billion); the communications, electronics, and electrical measuring instruments industry (\$21.3 billion); and the electrical machinery and appliance industry (\$21 billion). By scale of capital, the larger the scale, the greater is the amount of R&D expenditures per company. Enterprises with $\$1\sim5$ billion in capital spent \$1.3 billion per company, whereas enterprises with more than \$100 billion spent \$86.8 billion per company.

Looking at the ratios of R&D expenditures to sales by type of industry, the percentages are the highest for the so-called high-tech industries: pharmaceuticals, 11.0%; communications, electronics, and electrical measuring instruments, 8.6%; precision machinery, 6.7%; and electrical machinery and appliances, 6.5%. The average over all the types of industries was 3.6% (Figure 3). Looking at this according to the scale of capital, the percentage of sales for which R&D expenditures account is always larger for those enterprises with the greatest amount of capital: for enterprises with ¥1~5 billion, it was 2.4%, whereas for enterprises with more than ¥100 billion it was 4.3%.

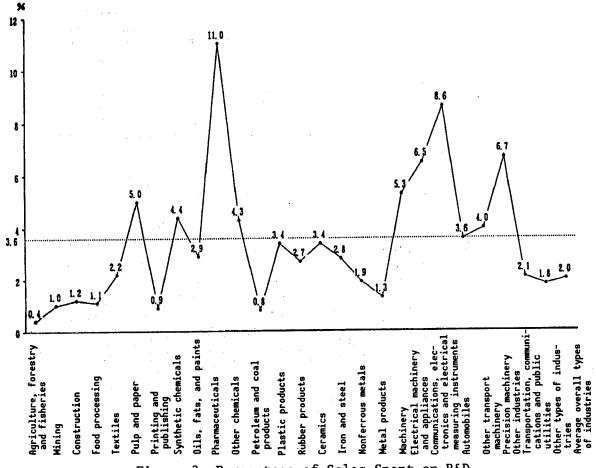


Figure 3. Percentage of Sales Spent on R&D

3. Number of Researchers

The total number of full-time researchers as of 31 March 1991 was 214,921. By type of industry, that was in the order of electrical machinery and appliances (50,322 researchers); communications, electronics, and electrical measuring instruments (27,347); and automobiles (26,883). Looking at the number of researchers per company by type of industry, enterprises in the communications, electronics, and electrical measuring instruments industry had 701 researchers per company, which was the most. That was followed by 599 in the electrical machinery and appliance industry and 572 in the automobile industry. The average over all types of industries was 259 researchers per company. Looking at this according to the scale of capital, there were more full-time researchers per company for those enterprises with the largest amounts of capital: for enterprises with ¥1~5 billion there were 47 researchers per company, whereas for enterprises with more than ¥100 billion there were 1,832.

The percentage of the total number of employees that are full-time researchers was highest for the communications, electronics, and electrical measuring instruments industry, 13.7%. That was followed by 13.4% for the oils, fats,

and paints industry; and 13.3% for "other" chemicals. The average over all the types of industries was 6.3%.

Incidentally, the number of foreign researchers employed in the enterprises that responded to the survey was 683. By type of industry, the nonferrous metals industry had 168 foreign researchers; the electrical machinery and appliance industry, 105; and the machinery industry, 89.

4. Number of Patents Held

The 368,964 patents held in Japan as of 31 March 1991 amount to 466 patents per company. By type of industry, the electrical machinery and appliance industry had 95,102 patents. That is followed by the communications, electronics, and electrical measuring instruments industry, with 44,174 patents; the synthetic chemicals industry, 40,303; and the automobile industry, with 31,452. The numbers of patents held per company by type of industry is in the order of the electrical machinery and appliance industry, with 1,219 patents per company; and the communications, electronics, and electrical measuring instruments industry, 1,162. By scale of capital, enterprises with more capital had more patents per company: enterprises with \$1~5 billion held 92 patents per company, whereas enterprises with more than \$100 billion had 3,499.

The 273,997 patents held outside of Japan amount to 360 patents per company. By type of industry, the electrical machinery and appliance industry had 57,014 patents. That is followed by the automobile industry, with 34,185 patents outside of Japan; and the synthetic chemicals industry, with 32,554. The numbers of patents held per company by type of industry is in the order of the precision machinery industry, with 1,007 patents per company; the automobile industry, 760; and the electrical machinery and appliance industry, 750. Looking at this by scale of capital, there are very large differences depending on the scale of capital: enterprises with ¥1~5 billion held 43 patents per company, whereas enterprises with more than ¥100 billion had 2,070.

5. Sales and Research Expenditures of Overseas Affiliated Firms

The total amount of sales by overseas affiliated firms (50% or more financed) was ¥28.8 trillion, and their research expenditures were ¥367.9 billion. The percentage of sales for which research expenditures account in overseas affiliated firms was 1.28%. According to this survey, the types of industries where overseas affiliated firms had the most research expenditures were the automobile and the electrical machinery and appliance industries.

6. Other

Although the subjects of the "FY1991 Survey Report on S&T Research" by the Management and Coordination Agency's Statistics Bureau are different from the subjects of this survey, a comparison of the FY1990 R&D expenditures of companies from that report with the R&D expenditures from this survey is given for reference in Table 4.

Table 4. Comparison With the Survey Report on S&T Research

Category	This survey	S&T research survey
R&D outlays	¥7.4022 trillion	¥9.246 trillion
Ratio of R&D outlays to sales	3.56%	2.78%
Subjects of survey	Private firms with ¥1 billion or more in capital that do R&D 1,301 companies	Comapnies with ¥5 million or more in capital About 12,700 companies
Recovery, etc.	Valid responses from 831 companies (63.9%) of the 1,301 surveyed	After recovering 80% of the re- sponses from 12,700 subjects, 900 secondary samples were chosen from the 2,500 unrecovered samples, and questionnaires relating to these secondary samples were collected

III. Summary of Survey Results

1. Perception of International Situation in Relation to S&T

(1) Comparison of R&D Strength With U.S. and Europe

We asked about how private firms in Japan think the relative position of their company's R&D strength in its respective industrial category compares with that of similar industries in the United States and Europe five years ago, now, and five years from now.

Looking at the overall trends, most firms think that five years ago the relative positioning was "United States > Europe > Japan," but most think that it is now "Japan = United States = Europe" and that in five years it will be "Japan > United States > Europe." According to this, many Japanese firms think that Japan's R&D strength was inferior to that of the United States and Europe five years ago, but that it has come up to par in the last five years; they predict that Japan will overtake the United States and Europe after five years (Figure 5). The total numbers of responses that Japan is stronger than the United States and Europe (the total for Japan > United States > Europe, Japan > Europe > United States, and Japan > United States = Europe) grow quickly—20% five years ago, 32% now, and 44% after five years. In contrast, the responses that the United States is the strongest and that Europe is the strongest rapidly decrease along the advance of time from five years ago to now to five years later (Figure 6).

By type of industry, most firms in the precision machinery industry, where Japan has strong technological power, consistently answered "Japan > United

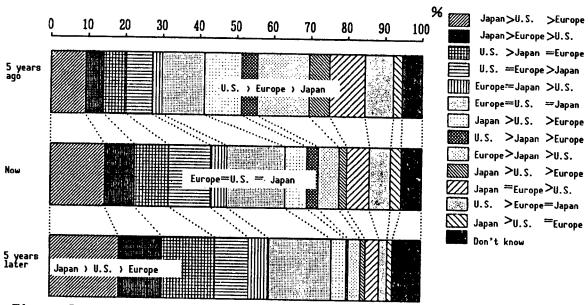


Figure 5. Comparison With R&D Strength of the United States and Europe

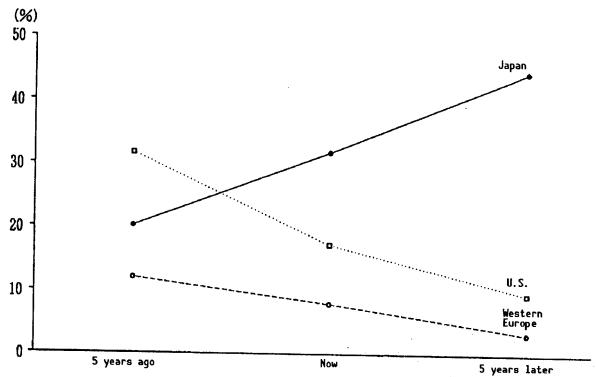


Figure 6. Changes in Relative Superiority of Japan's R&D Strength With That of the United States and Europe (Total numbers of responses that the firms in the respective countries are tops in R&D strength)

States > Europe" from five years ago until after five years. Most firms in the electrical machinery and appliance industry said "United States > Japan > Europe" for five years ago only, and "Japan > United States > Europe" now and after five years. In contrast, most pharmaceuticals firms responded that until now the United States and Europe have been dominant, but "Japan = United States = Europe" after five years. The petroleum and coal products industry was unique in that most firms from that industry said "United States > Europe > Japan" even after five years. Most firms in the iron and steel and machinery industries consistently answered "Japan > Europe > United States" from five years ago until after five years; a distinguishing characteristic here is that these firms think that Europe is stronger than the United States The automobile industry is also one of Japan's strong industries. Most automobile firms said "Japan > United States > Europe" five years ago until now, but "Japan > Europe > United States" after five years. The responses that Europe's R&D strength will rise above that of the United States is worth noting.

(2) Future International Situation in Connection With S&T

In the international situation surrounding Japan, various problems in the economic face of things are arising, number one of which is trade problems. We asked the firms what they think about this situation as it relates to S&T: 62% answered that "competition involving S&T among Japan, Europe and the United States will exist in the future, too, but there are also continuing efforts that grope for cooperation in regions, so tense international relations will continue partly and intermittently"; 17% answered that "because other countries will also be building up their S&T strength, which is the wellspring of economic power, tense international relations in connection with S&T (technology disputes, etc.) will become more intense." Taken together, these responses that tense international relations in connection with S&T "will continue to be tense" and "will grow more tense" account for 79% of all the responses to this question. It appears that the majority of firms grasp the international situation in connection with S&T as becoming more severe from now on (Figure 7). This relates to the fact that many firms predict that Japan's R&D strength will surpass that of the United States and Europe after five years.

We asked those firms that responded that "tense relations will continue" or that they "will grow more tense" about how they will cope with the situation if tense international relations do not disappear. Only 15% said that they "will not deal with it in any active way," 36% said "R&D cooperation," 28% said "technology transfer," and 12% said "establishing R&D strongpoints overseas." From this we gather that the attitude of firms is to actively cope with the situation (Figure 8).

(3) Technological Strength of the Asian NIEs

Many private firms think that Japan's R&D strength is now at about the same level as that of Europe and the United States, and that after five years it will surpass that of Europe and the United States When we asked them how they view the technological strength in the same category of industry of the Asian NIEs (in particular, Korea and Taiwan), which are geographically close to



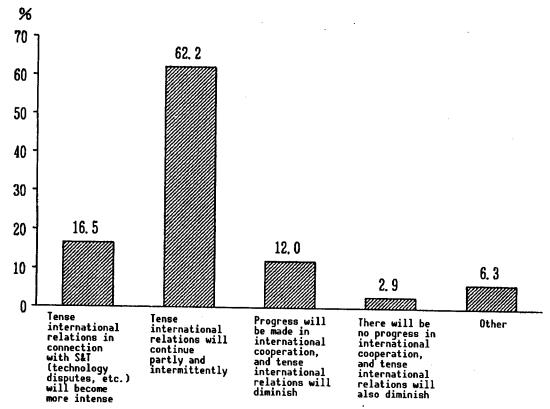


Figure 7. International Situation in Connection With S&T

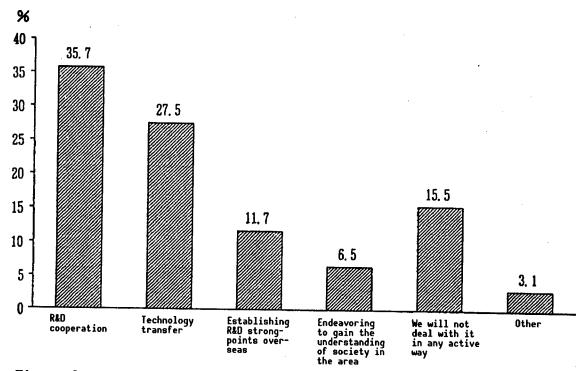


Figure 8. How Firms Will Cope If Tense International Relations Do Not Disappear

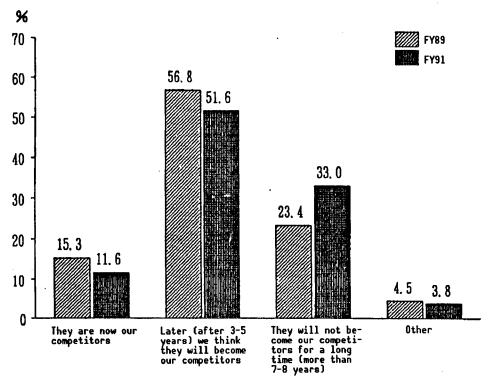


Figure 9. Technological Strength of Asian NIEs in Same Categories of Industry

Japan, 12% said that "they are now our competitors," 52% said that "later (after 3 to 5 years) we think they will become our competitors," and 33% said that "they will not become our competitors for a long time (more than 7 or 8 years)" (Figure 9). By type of industry, most of the firms that answered "they are now our competitors" were in materials—type industries, such as textiles, 31%, and iron and steel, 25%. There was an especially large number of pharmaceuticals firms, 70%, that answered "they will not become our competitors for a long time (more than 7 or 8 years)."

When we compared these results with those from the FY89 survey, the numbers of firms that answered "they are now our competitors" and "later they will become our competitors" decreased, whereas those that answered "they will not become our competitors for a long time" increased. This is thought to indicate that the technological strength of Japan's private firms has achieved growth that is higher than the growth of the Asian NIEs technological strength in recent years.

2. State of Globalization of Private Enterprises' R&D Activities

(1) State of Ownership of Overseas R&D Strongpoints

Japan's private firms are expanding their activities internationally, and, starting with sales strongpoints, they are setting up production strongpoints and even R&D strongpoints overseas. So when we looked at the state of

ownership of overseas R&D strongpoints (strongpoints where two or more researchers do R&D work; includes overseas affiliated firms that are 50% or more financed), we found that, overall, 117 firms (14%) have R&D strongpoints overseas and there were 276 of these overseas R&D strongpoints in total. That amounts to 2.4 overseas R&D strongpoints for each firm that has them. The largest number of such strongpoints is 14. By scale of capital, the largest number of such strongpoints is 4 for firms with \$1-5 billion in capital, 10 for firms with between \$10-50 billion, and 14 for firms with more than \$100 billion. Firms with the larger amounts of capital have a greater number of overseas R&D strongpoints.

By type of industry, the electrical machinery and appliance industry has 54 overseas R&D strongpoints (19 companies), followed by the machinery industry with 36 (13 companies), the automobile industry with 30 (15 companies), and the pharmaceuticals industry with 20 (13 companies). Conversely, there were only a few types of industries that do not have a single overseas R&D strongpoint: construction; plastic products; and transportation, communications, and public utilities, among others. By scale of capital, 36% (14 companies) of the firms with more than ¥100 billion in capital and 49% (22 companies) with ¥50~100 billion have R&D strongpoints overseas. In contrast, that percentage is generally low for firms with less than ¥50 billion in capital, and 5% (14 companies) of the firms with ¥1~5 billion have R&D strongpoints overseas.

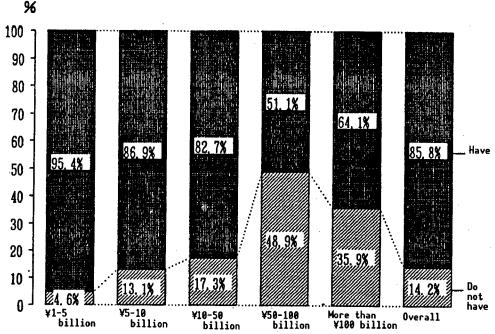


Figure 10. State of Ownership of Overseas R&D Strongpoints (By scale of capital)

(2) When Overseas R&D Strongpoints Were Set Up and Why, When, Where, and for What Kinds of Reasons Did Private Firms Set Up Close to 300 Overseas R&D Strongpoints?

We looked at the time periods during which the companies first set overseas R&D strongpoints, by region. In the United States, 13 during companies the 1970s and 13 companies during the first half of the 1980s set up strongpoints, whereas after 1985, 75 companies did so. In Western Europe, too, was six companies during the 1970s, three companies during the first half of the 1980s, and 43 companies after 1985. In the Asian NIEs, it was

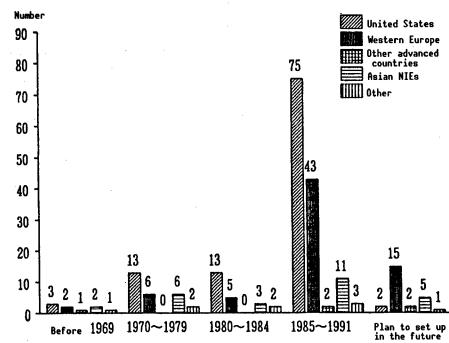


Figure 11. When First Overseas R&D Strongpoints Were Set Up (The values shown are total numbers of only the strongpoints that firms initially set up in the regions.)

six companies during the 1970s, three companies during the first half of the 1980s, and 11 companies after 1985. It is apparent that after 1985 there was a sudden increase in the number of R&D strongpoints set up in all of the regions (Figure 11). When we look at future plans to set up R&D strongpoints overseas, 15 companies plan to do so in Western Europe, where there will be a single EC market at the end of 1992, and five companies plan to do so in the Asian NIEs.

The most prevalent reason why private firms set up R&D strongpoints in any of the regions is for "R&D that copes with overseas needs, and the improvement of products." 75% of the firms that set up strongpoints in the United States gave this answer, as did 70% of those that set up in Western Europe and 77% in the Asian NIEs. This is seen as a way to cope with having to develop products that meet the demands of the area, and not just merely providing one type of product. The next most predominant reason for setting up strongpoints in Europe and United States was "to search for technology seeds"; 46% of the firms that set up in the United States and 45% of the firms in Europe gave this answer. As for the Asian NIEs, the second most often cited reason, given by 68% of the firms, was "to strengthen the technological power of production strongpoints" (Figure 12).

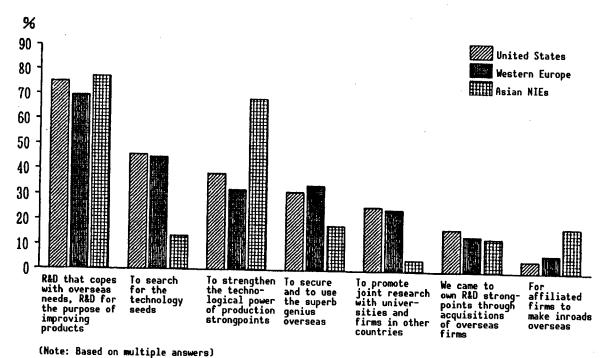


Figure 12. Reasons for Setting Up R&D Strongpoints Overseas

Looking at the characteristics οf the major types of industries, 67% the pharmaceuticals firms said that their main reason for setting up R&D strongpoints overseas was "to search for technology seeds." It is also noteworthy that the communications. electronics, and electrical measuring instruments industry cites its prime reason "R&D that copes

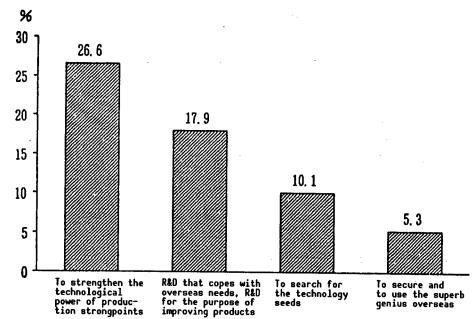


Figure 13. Percentages of Firms Saying That There Have Already Been Results From Setting Up Overseas R&D Strongpoints for the Reasons Given

with overseas needs, and the improvement of products" (United States, 67%; Western Europe, 75%).

When we asked whether or not there have already been results from setting up R&D strongpoints overseas for the reasons given, 27% of the firms whose reason was "to strengthen the technological power of production strongpoints" and 18% of those whose reason was "R&D that copes with overseas needs, and the improvement of products" said that there have been results. It appears that private firms do not often obtain the results at which they had originally aimed. And, only 10% of the firms whose reason was "to search for technology seeds" and 5% of those whose reason was "to secure and to use the superb genius [i.e., talented researchers and engineers] overseas" said that results had been obtained (Figure 13).

(3) Research Management Problems at R&D Strongpoints Overseas

Although firms set up R&D strongpoints overseas, the reality of the situation is that results as originally aimed for have yet to be obtained. So, we asked about research management problems at the R&D strongpoints that firms set up overseas when the strongpoints were first set up, now, and in the future. We asked about the United States, Europe, and Asia separately. In the United States and Europe, where many strongpoints have been set up, the greatest problem in research management in the future will be "the efficient yield of R&D results." "Ensuring R&D personnel overseas" was a management problem at the time strongpoints were set up and will continue to be a problem in the future. In addition, "the treatment of intellectual property rights" is another problem that will increase from now on.

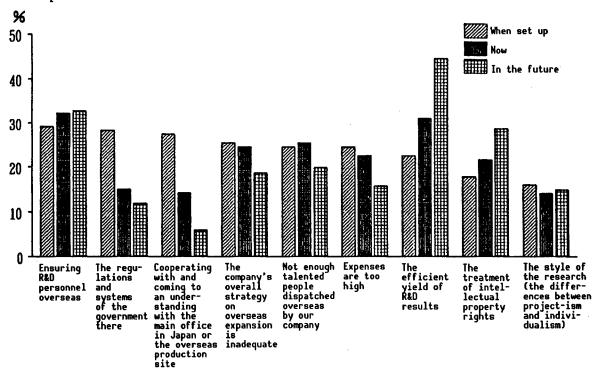


Figure 14. Research Management Problems at R&D Strongpoints Overseas (Europe and the United States)

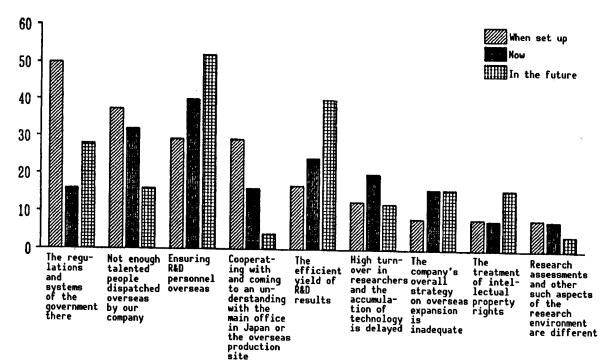


Figure 15. Research Management Problems at R&D Strongpoints Overseas (Asia)

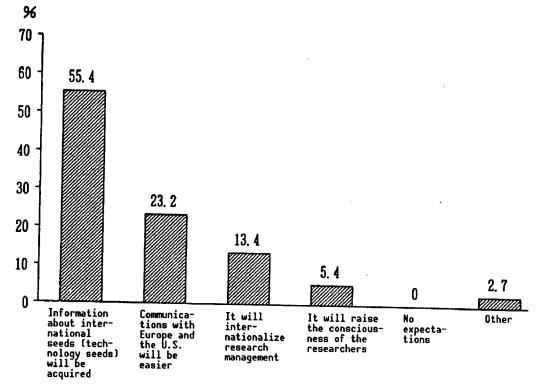


Figure 16. Expected Effects of Establishing European and U.S. R&D Strongpoints on Japanese R&D Strongpoints

As for Asia, "the regulations and systems of the government there" and "not enough talented people dispatched overseas by our company" were big problems at the time strongpoints were set up. Now and in the future, however, firms see those problems as being solved and instead there are more problems with "the efficient yield of R&D results" and "ensuring R&D personnel overseas (Figures 14 and 15).

(4) Effects on Japanese R&D Strongpoints of Establishing European and U.S. R&D Strongpoints

The primary objective of setting up R&D strongpoints in Europe and the United States, as explained before, was "R&D that copes with overseas needs, and the improvement of products." So, what kinds of effects on R&D strongpoints in Japan do firms expect that this establishment of R&D strongpoints in Europe and the United States will have? On this point, 55% of the firms answered that "information about international seeds (technology seeds) will be acquired," 23% said that "communications with Europe and the United States will be easier," and 13% said that "it will internationalize research management" (Figure 16). It appears that the tendency to rely on other countries for uncovering seeds continues.

(5) Content of Research at R&D Strongpoints Overseas

We asked about the content of the research that is now being done and that which is planned for five years later at R&D strongpoints overseas.

As for the research that is now being done, 75% of the firms answered that it involves "the development of products that correspond to the market in the area," 24% said "research for the purpose of improving productivity," 23% said "the development of what will become core technologies," and 15% said "research to clear the regulations there." Naturally, much of the research corresponds to the reasons given for setting up R&D strongpoints overseas: "R&D that copes with overseas needs and R&D for the purpose of improving products" and "to strengthen the technological power of production strongpoints."

As for five years from now, 73% of the firms answered "the development of products that correspond to the market in the area," which is no change. However, 46% said that the content of their research five years from now will be "the development of what will become core technologies," which is double the number that are doing such research now (Figure 17).

By type of industry, a high percentage of pharmaceuticals firms (33%) and electrical machinery and appliance firms (32%) are now doing basic research. We know that these types of industries place a great deal of importance on basic research overseas. The types of industries that will significantly increase "the development of what will become core technologies" in five years are the communications, electronics, and electrical measuring instruments industry (75%) and the precision machinery industry (63%), which are the types of industries in which Japan is technologically strong. Many of these kinds of firms are expanding their production strongpoints overseas, so we can view

this as an indication of their strategy to develop in the countries where their production strongpoints are located that which will become the core technologies for the development of needed products.

(6) Number of Researchers and Their Nationalities at R&D Strongpoints Overseas

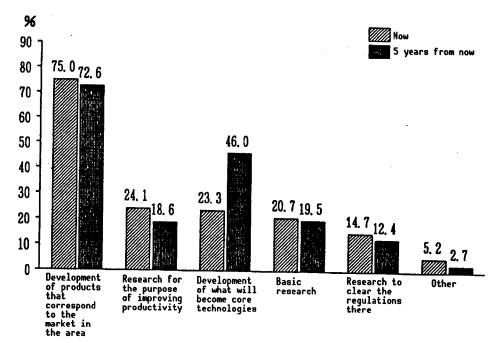


Figure 17. Content of Research at R&D Strongpoints Overseas

Five years ago, the total number of researchers per company that were employed at R&D strongpoints overseas was small in scale: more than half of the companies, 24 of them, said that they had "1~4 people." In contrast, most of the companies, 27 in all, now have "20~49 people" employed at R&D

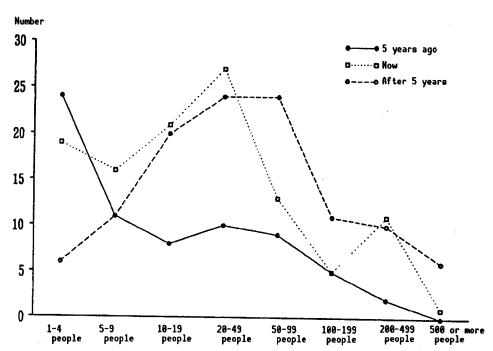


Figure 18. Number of Researchers at R&D Strongpoints Overseas

strongpoints overseas. The number of researchers is steadily increasing; it is higher now than five years ago, and it will be higher five years from now (Figure 18). And, after five years the number of researchers will increase even more—there will be six companies with 500 or more researchers. There

were three automobile companies, two electrical machinery and appliance companies, and one chemical company that answered that they will have 500 or more researchers at their R&D strongpoints overseas.

% As for the na-60 70 80 90 100 10 20 30 40 50 tionalities the researchers, the responses of Mainly Mainly Japanése "mainly nonnon-Japanese years 44. 9% Japanese" and "mainly Japanese" were about the same for five years ago. Now, however, 66. 1% with about 70% of the responses "mainly non-Japanese," we know that the After R&D strongpoints 72, 5% of private firms years are primarily run by non-Figure 19. Nationalities of Researchers at R&D Strongpoints Japanese re-

firms that said that it will be "mainly non-Japanese" five years from now, and less than 10% said "mainly Japanese" (Figure 19).

The forecast is that as research strongpoints grow larger in scale, the percentage of Japanese researchers will decrease.

(7) Joint Research at Overseas R&D Strongpoints

searchers. There were even more

The R&D strongpoints that have been set up overseas provide a critical foothold for the private firms of Japan to conduct joint research with the universities, firms, and government research institutes of foreign countries. The number of joint research efforts of overseas R&D strongpoints with universities, firms, and government research institutes of foreign countries was 73 five years ago, but, as the number of R&D strongpoints overseas increases, joint research efforts will increase to 2.9 times the current 214 projects. Japanese firms appear to be actively taking part in joint research.

(8) Why Some Japanese Firms Do Not Establish R&D Strongpoints Overseas

When we asked the firms that have not set up R&D strongpoints overseas (698 companies) why they have not done so, 52% answered that their "R&D strongpoints in Japan are sufficient, and there is no need to establish any overseas," and 27% said that they "cannot afford to set up strongpoints overseas" (Figure 20).

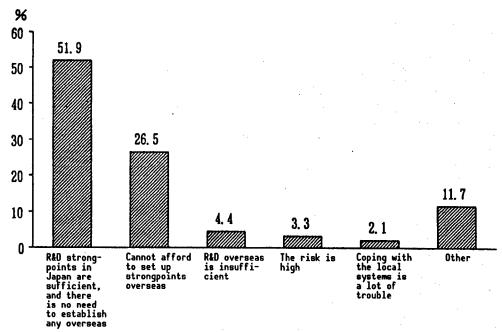


Figure 20. Why Some Japanese Firms Do Not Establish R&D Strongpoints Overseas

By type of industry, many domestic-demand-type firms, e.g., 76% of those in the pulp and paper industry and 73% of construction firms, answered that their "R&D strongpoints in Japan are sufficient, and there is no need to establish any overseas." Conversely, the types of firms that replied that they "cannot afford to set up strongpoints overseas," even though do not think that the R&D strongpoints in Japan are adequate, included 43% of the pharmaceuticals firms and 42% of the synthetic chemicals firms.

When we looked at this by scale of capital, a trend was seen in that the smaller the scale of capital, the more firms there were that answered that they "cannot afford to set up strongpoints overseas." A large difference is apparent: 27% of the firms with less than ¥50 billion in capital gave this response, but only 17% of the firms with more than ¥50 billion said so. This supports the fact that there was a higher percentage of firms with large amounts of capital that have R&D strongpoints overseas.

(9) Technology Trade Results

Technology trade, in which technology such as patents, know-how, and technical guidance are supplied to or received from foreign countries, is an important index of international technical exchange. When we asked firms if they engaged in technology trade, 36% answered that it was "both technology trade imports and exports," 13% said "only technology trade exports," 15% said "only technology trade imports," and 36% said "no technology trade" (Figure 21). When we asked those firms that export technology whether or not their trading partners were subsidiaries, 43% replied that their technology trade was with "subsidiaries only," and 27% said "mostly subsidiaries." Taken together these

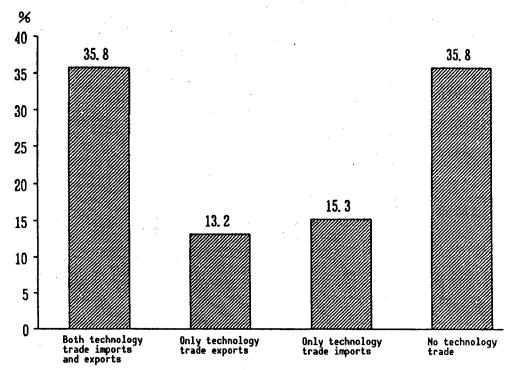
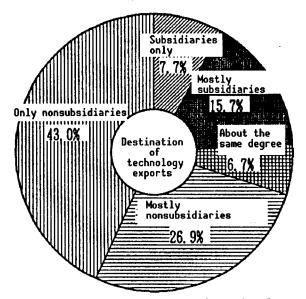


Figure 21. Technology Trade Results

account for about 70% of the responses, indicating that technology trade is carried out widely regardless of whether or not there is a capital relationship (Figure 22).

By type of industry, many domesticdemand-type firms had no technology trade results, e.g., transportation, communications, and public utilities (77% of which had no technology trade); the construction industry (64%); the pulp and paper industry (58%). In response to the previous question about the comparison of the R&D strength of Japan, Europe, and the United States, these types of industries gave the most responses that now "Japan - United States = Europe." This indicates that Figure 22. Proportions of Technology there is little difference in R&D strength and that it is not easy for technology trade to be carried out by



Export Destinations

these domestic-demand-type industries, perhaps because they do not have many interdependent relationships internationally.

(10) Relative Importance of Asian NIEs in R&D Strategy

The viewpoint that the Asian NIEs will not become competitive partners with respect to technological strength for a long while has become more prevalent. So, as what sort of strongpoints are the Asian NIEs regarded in R&D strategies, and what is their relative importance? On this point, we know that firms see the Asian NIEs as product development strongpoints: 71% of the firms replied that the NIEs are "not important as R&D strongpoints," and 30% said that they are important as "product development strongpoints (including production support)" (Figure 23).

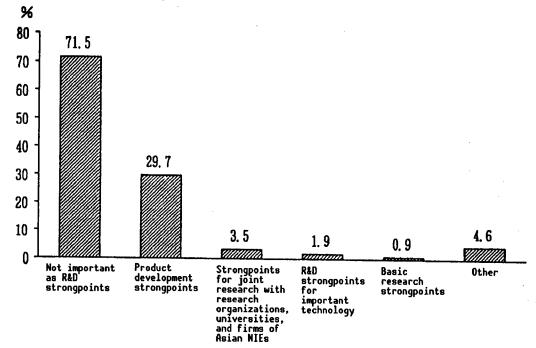


Figure 23. Relative Importance of Asian NIEs

(11) Contributions Made, Research Commissioned to Universities Overseas and in Japan

The relationship between firms and universities is very important for R&D activities, and, in the search for new knowledge, joint research and commissioned research is being carried out with vigor. In recent years, relationships with universities overseas, and not just Japanese universities, have become lively. So, in order to look at the flow of funds from firms to universities, we investigated overseas universities and Japanese universities separately with respect to the total amounts of endowments and commissioned research expenditures. The result was that 76% of the firms (497 companies) said that they have given "nothing at all" for endowments and commissioned research at overseas universities, whereas only 24% (185 companies) said that they give "nothing at all" to Japanese universities. And, with respect to all the different amount categories, there were many more firms that gave to Japanese universities than to overseas universities. In the totals for all the firms, clearly that for Japanese universities is a great deal higher than that for overseas universities (Figure 24).

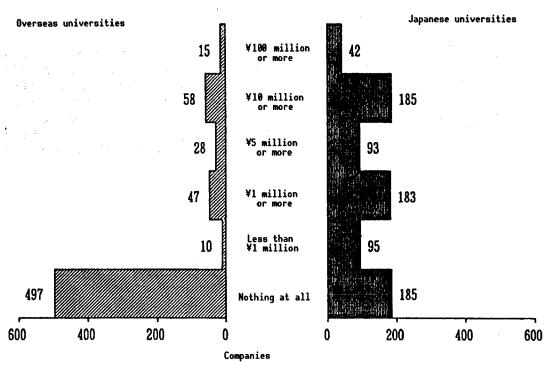


Figure 24. Contributions Made, Research Commissioned to Universities Overseas and in Europe

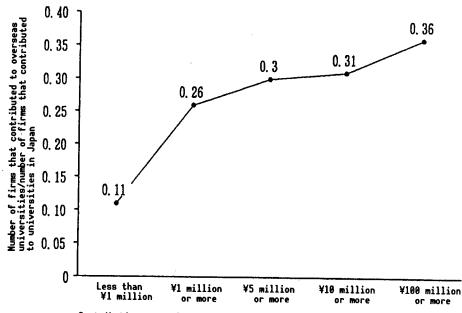
By scale of capital there clearly appears to be a trend where the larger the scale of the firm, the more money is given to universities, whether they are in Japan or overseas.

When we looked at the ratio of the number of firms that contributed to and commissioned research to overseas universities and the number of firms that gave to Japanese universities according to the amount of the contributions and commissioned research expenditures, the larger the amount, the higher the ratio is of the number of firms that gave to universities overseas (Figure 25).

Although the number of such responses was small (24 companies), there were some firms that gave more in contributions and commissioned research expenditures to overseas universities than to Japanese universities. When we asked them why, 29% answered that "overseas universities are at a higher level," and 26% said "because Japanese universities are not accustomed to industry-university cooperation" (Figure 26).

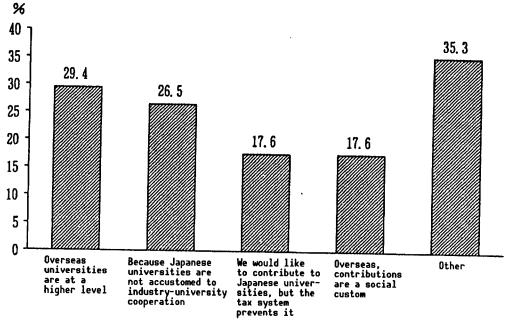
(12) Ultimate Image of International Expansion of R&D

As is clear from the survey results thus far, Japan's private firms are actively expanding their R&D internationally by setting up R&D strongpoints overseas, exchanging technology with universities and firms overseas, and so forth. How do these firms regard the ultimate image of their international R&D expansion? When we asked them about that ultimate image, including whether or



Contributions, commissioned research expenditures

Figure 25. Ratio of Number of Firms That Contributed To and Commissioned Overseas and Japanese Universities



(Note: Based on multiple answers)

Figure 26. Why Firms Contribute More and Commission More Research to Overseas Universities Than to Japanese Universities

not they have plans for international expansion of their R&D, only 34% answered that they "do not intend to internationally expand R&D." Of the more than 60% of all the firms that do have an ultimate image of international expansion, 24%, which was the most, said that they "have the core R&D

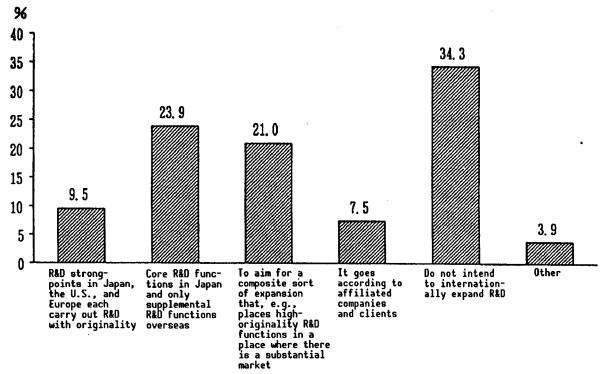


Figure 27. Ultimate Image of International Expansion of R&D

functions in Japan, and overseas only set up supplemental R&D functions." On the other hand, 21% said that they "aim for a composite sort of expansion that, for example, places high-originality R&D functions in a places where there is a substantial market." R&D that has originality is seen as increasing in the future: 10% of the firms replied that their "R&D strongpoints in Japan, the United States, and Europe each carry out R&D with originality." Then 8% answered that "it goes according to affiliated companies and clients" (Figure 27).

3. State of Globalization of R&D Strongpoints in Japan

(1) Numbers of Non-Japanese Researchers

Although there have been considerably more non-Japanese researchers than Japanese researchers at the overseas R&D strongpoints of Japanese firms, non-Japanese researchers employed in Japanese firms inside Japan are still few in number.

We asked about the numbers of non-Japanese researchers inside Japan, by their nationalities, three years ago and now. The total number three years ago was 219; that number is now 751, which is a sudden increase of 3.4-fold in the past three years. By nationality, three years ago there were 87 Asians, 74 Americans, 48 West Europeans, and 10 people from other countries; there were about the same number of researchers from Asia as the United States Now, there are 397 Asians, 189 Americans, 125 West Europeans, and 40 researchers from

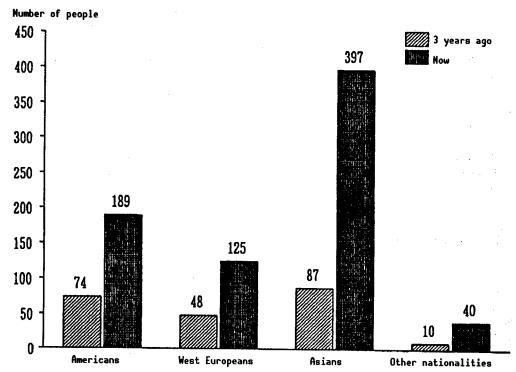


Figure 28. Numbers of Non-Japanese Researchers at R&D Strongpoints in Japan, by Nationality

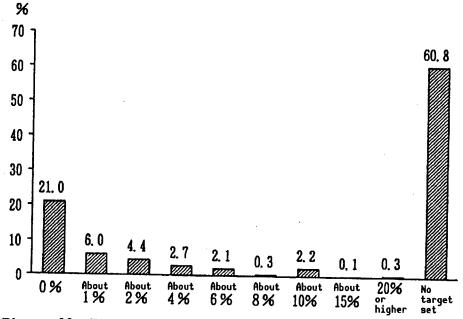


Figure 29. Future Target Percentages of Non-Japanese Researchers at R&D Strongpoints in Japan

other countries. The numbers for all of the nationalities are increasing, but the increase in the number of researchers from Asia is especially growing (Figure 28). The reason why there are so many Asian researchers is thought to be because there have been more opportunities for Asian university students in Japan to stay in Japan and work for Japanese firms after they graduate.

We asked about future targets for the percentages of non-Japanese researchers at R&D strongpoints inside Japan. Most firms, 61% of them, answered that they have not set any targets; 21% of the firms said "0%" but 6% of the firms said "about 1%" and 4% of the firms said "about 2%." There were also 20 companies that said that their target is 10% or higher. This is thought to largely reflect the differences in strategies among firms (Figure 29).

(2) Acceptance of Trainees and Researchers Sent Because of Mutual Dispatching, Dispatching Researchers to Foreign Countries

Accepting talented people from foreign countries and sending people to foreign countries are effective means of international technical exchange. Firms now have accepted 538 foreign researchers as trainees and 75 foreign researchers as a part of mutual dispatching. In contrast, the number of Japanese

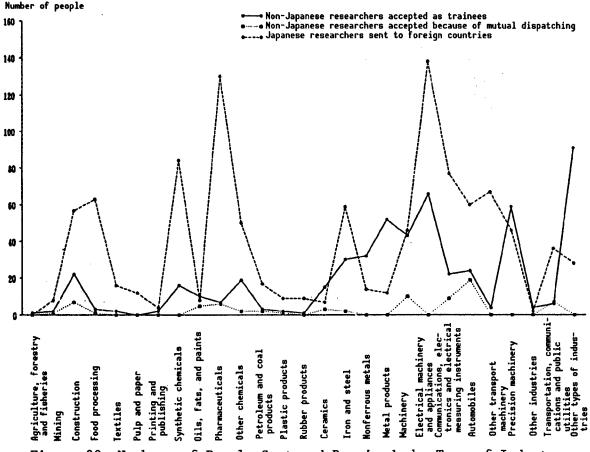


Figure 30. Numbers of People Sent and Received, by Type of Industry

researchers dispatched by firms to foreign countries stands at 1,059. With the ratio of the number of people sent abroad to the number accepted in Japan at two to one, we should require firms to put more effort into accepting foreign researchers.

By type of industry, the most foreign researchers are accepted as trainees by electrical machinery and appliance firms, precision machinery firms, and metal products firms. The most foreign researchers are accepted as a result of mutual dispatching by automobile firms and machinery firms. The most Japanese researchers are sent to foreign countries by electrical machinery and appliance firms, pharmaceuticals firms, and synthetic chemicals firms (Figure 30).

(3) Employment of Non-Japanese Researchers

As discussed previously, there has been a rapid increase in the number of non-Japanese researchers employed in Japanese firms within Japan. Furthermore, there are more than a few firms that have set targets of 10% or more for the percentage of non-Japanese researchers they will employ in the future. When we asked firms that employ non-Japanese researchers at their R&D strongpoints in Japan what their reasons are for doing so, a surprisingly small number, 32%, answered "for the development of new technology that is touched off by differences in concepts," a response that is generally assumed. The effects of the shortage of researchers are also apparent: most firms, 40% of them, responded that they employ non-Japanese researchers to "shore up the lack of talented personnel" (Figure 31).

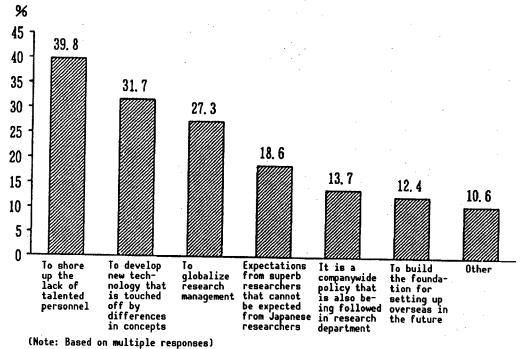


Figure 31. Reasons for Employing Non-Japanese Researchers

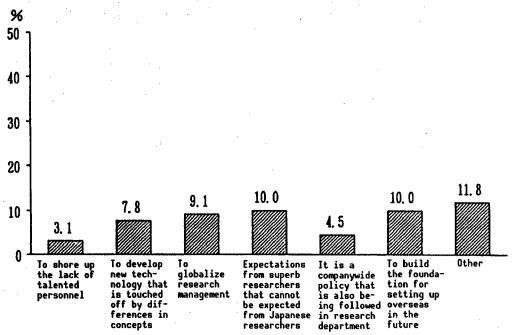


Figure 32. Percentage of Firms That Already Saw Results From Employing Non-Japanese Researchers for Reasons Given

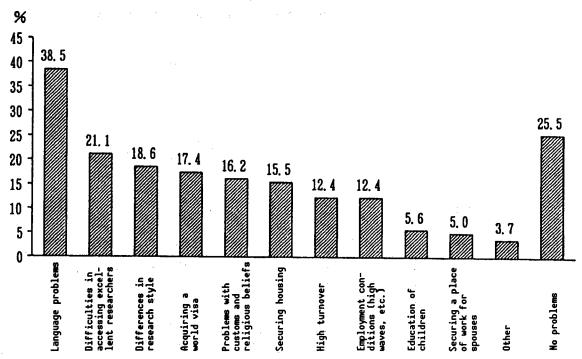


Figure 33. Problems Encountered in Employing Non-Japanese Researchers

We also asked whether or not there have already been results from employing non-Japanese researchers for these reasons, and it seems that hardly any results have been seen yet (Figure 32).

When we asked about the problems encountered when employing non-Japanese researchers, 25% of the firms answered that "there are no problems." The biggest difficulty is with "language problems," which 39% of the firms cited. Then 21% of the firms said that they had "difficulties in accessing excellent researchers," and 19% said that "differences in research style" are a problem. Except for language problems, considerable progress is expected to be made in the employment of non-Japanese researchers by firms (Figure 33).

(4) Joint Research of R&D Strongpoints in Japan with Organizations Overseas

It has been shown that the relationships of the overseas R&D strongpoints of firms with the universities, firms, and government research institutes of foreign countries have become very energetic, but when we asked about the extent to which R&D strongpoints inside Japan do joint research with the universities, firms, and government research institutes of foreign countries, we found that five years ago there were 967 such joint efforts. Now that number is 1,773—in five years, a 1.8-fold increase. Joint research with research organizations overseas is becoming more vigorous, both at overseas strongpoints and at strongpoints in Japan.

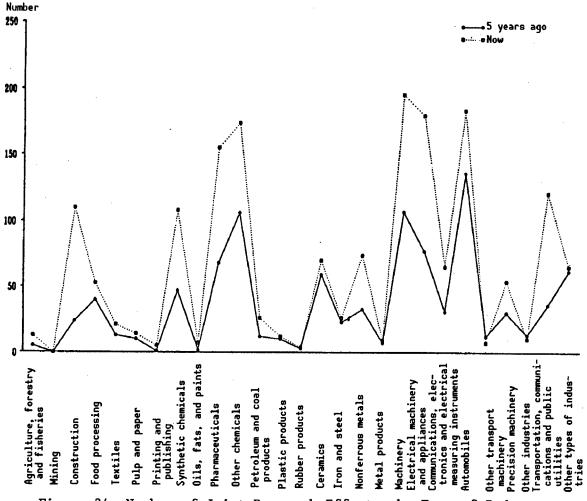
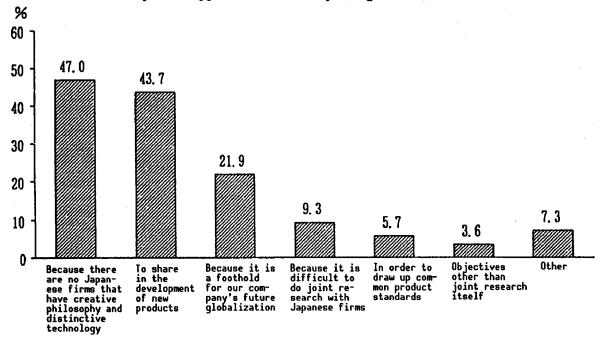


Figure 34. Number of Joint Research Efforts, by Type of Industry

Most of the different types of industries are now doing more joint research with overseas organizations than they did five years ago. The largest numbers of joint efforts are by the machinery industry, automobile industry, and electrical machinery and appliance industry (Figure 34).



(Note: Based on multiple responses)

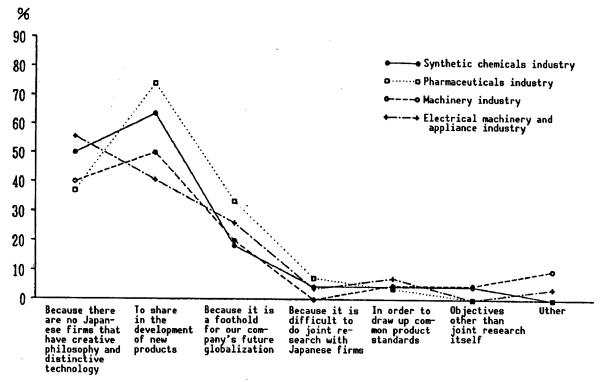
Figure 35. Why R&D Strongpoints in Japan Carry Out Joint Research With Overseas Firms

When we asked the 247 companies that are carrying out joint research with overseas firms, their reasons for doing so, 47% answered that it is "because there are no Japanese firms that have creative philosophy and distinctive technology," 44% said "to share in the development of new products," and 22% said "because it is a foothold for our company's future globalization" (Figure 35). We gather that the idea among firms that creative philosophy and distinctive technology comes from overseas still remains strong.

By type of industry, many electrical machinery and appliance firms answered that they carry out joint research with overseas firms "because there are no Japanese firms that have creative philosophy and distinctive technology," while many pharmaceuticals firms and synthetic chemicals firms said "to share in the development of new products" (Figure 36).

(5) Setting Up Open Basic Research Laboratories in Japan

Overseas there are several examples of private firms operating laboratories such as Bell Labs that carry out very leading-edge research with a broad-minded outlook towards accepting outside researchers. The laboratories have played a leading role in the history of S&T. When we asked the firms what they think about setting up such a laboratory in Japan, 79% answered that "although we recognize the need for such a laboratory, our company does not think about



(Note: Based on multiple responses)

Figure 36. Reasons for Doing Joint Research, by Type of Industry

setting one up," 1% (7 companies) said "that kind of laboratory (department) is necessary, and we are already setting one up," and 1% (8 companies) said "that kind of laboratory (department) is necessary, and we are planning to set one up." In contrast, 9% answered that "bringing such a laboratory into existence in Japan's research climate would be difficult," and 3% said "even from a worldwide view, firms do not need such laboratories." Although there was a small number of firms with a negative view on this and most of them think that such laboratories are necessary, setting up such a laboratory is not thought to be possible in reality because of reasons such as the costs involved (Figure 37). Even in this survey, there was not one firm with less than ¥10 billion in capital that said "that kind of laboratory (department) is necessary, and we are already setting one up."

(6) Publication of Results From Basic Research Departments

In recent years, basic research has come to be done in Japanese firms. What do Japanese firms think about publishing the results from their basic research departments?

When we asked about the extent to which the results from the firms' own basic research departments are published in comparison with U.S. and European firms that are in the same kind of industry, 2% answered that now they "publish more than U.S. and European firms," 19% said "the same as U.S. and European firms," and 27% said that they "do not publish as much as U.S. and European firms."

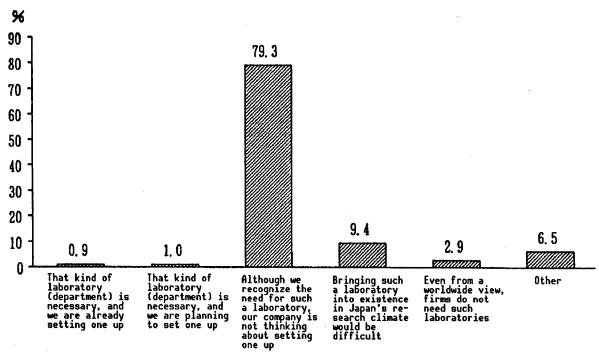


Figure 37. Establishment of Laboratories as Bell Labs That Play a Leading Role

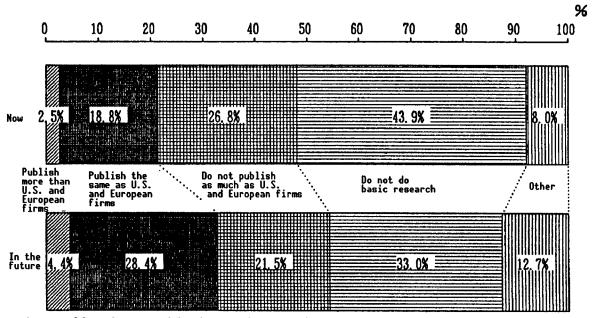


Figure 38. About Publishing the Results From Basic Research Departments

As for the future, 4% said that they will "publish more than U.S. and European firms," 28% said "the same as U.S. and European firms," and 21% said that they will "not publish as much as U.S. and European firms." This indicates that in the future firms will tend to publish their results more than firms do in the

United States and Europe, but it is noticeable that there are more firms that "will not publish as much" than there are firms that "will publish as much" (Figure 38). It is possible that this kind of outcome is due to the fact that the attitude towards basic research results differs with that in the U.S. and Europe. From now on, however, Japanese firms will be required to publish their results at least to an extent that is "the same as U.S. and European firms."

(7) Adopting the Same or Similar Rules as Overseas at R&D Strongpoints in Japan

Along with the increase in private Japanese firms' expansion of R&D activities beyond the borders of Japan, differences in systems and customs among countries have been looked at closely, and the differences in research management between Japanese and local firms are also starting to be recognized. Management in Japan is sometimes not that which is common throughout the world, and Japanese firms are being asked to recheck their research management and to establish rational, clear management that is common to that which is employed throughout the world. Referring to and adopting the rules of overseas R&D strongpoints and of overseas private firms' R&D strongpoints is thought to be linked with the steps of globalization.

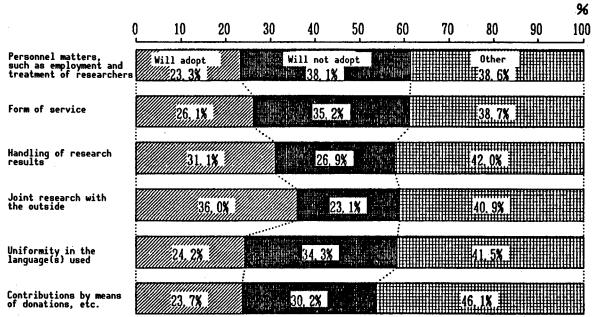


Figure 39. Adopting the Same or Similar Rules as Overseas at R&D Strongpoints in Japan

With respect to six items, we asked firms whether they consider adopting rules in the future at their R&D strongpoints in Japan that are the same or similar to those employed at their overseas R&D strongpoints or at overseas private firms' R&D strongpoints. Considering all the answers given except for "other," there were more "will adopt" than "will not adopt" answers for two items, "handling of research results" and "joint research with the outside," which was expected to a certain extent. However, there was also a surprisingly large number of firms that said they will adopt rules having to do with "personnel"

matters, such as the employment and treatment of researchers," which pertains to the basis of business management. To a certain extent, firms are also reckoning with "uniformity in the language(s) used" (Figure 39). In general, there was a relatively large percentage of firms that answered "will adopt," which were more positive results than had been expected with respect to the adoption of the same rules. It is worth noting that firms with more than \mathbb{Y}100 billion in capital gave more "will adopt" responses than "will not adopt" for all of the items except "uniformity in the language(s) used."

4. Making Rules To Facilitate the Activities of Private Firms

(1) Trouble over Intellectual Property Rights

In recent years, the U.S. and European countries have attached great importance to the protection of intellectual property rights. Concomitant with the internationalization of R&D activities by private Japanese firms, trouble is expected to increase.

We asked about the occurrence of trouwith overseas ble firms in different regions over intellectual property rights. More firms answered that trouble with firms in all the regions, but especially in the U.S., is "increasing" rather than "decreasing" (Figure 40).

By type of industry, the percentage of firms in leading-edge technology fields that said trouble is "increasing," particularly with the U.S., was much greater than

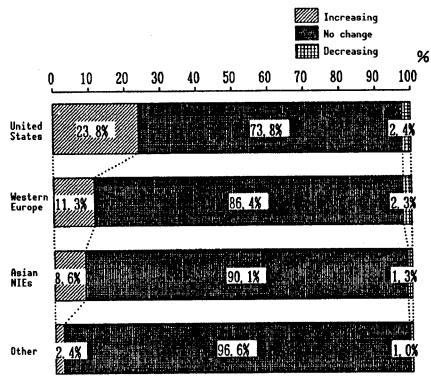


Figure 40. Trouble Over Intellectual Property Rights

the average. Large percentages of firms in the precision machinery industry (52%), the communications, electronics, and electrical measuring instruments industry (43%), and the electrical machinery and appliance industry (39%) said that trouble is "increasing." A large percentage of pharmaceuticals firms (33%) said trouble with Western Europe is "increasing," from which it is gathered that the Japanese pharmaceuticals industry is in fierce R&D competition with mainly Western European rivals.

(2) S&T-Related Problems in Relationships with the U.S.

A variety of problems are expected to occur in relationships with other countries as Japan's S&T activities unfold internationally. With the United States, in particular, there is a salient trend, so we asked firms what kinds of problems relating to S&T are there now and will there be in their relationship with the United States In their responses about now, 35% answered that there are "problems relating to intellectual property rights," 15% said "problems relating to export control laws," and 14% said "the growing difficulty in introducing technology." In their responses about the future, the percentage of firms that answered that there will be "no problems" dropped to 25%, while on the other hand the trend towards increasing problems was seen (Figure 41): 48% of the firms responded that there will be "problems relating to intellectual property rights," 20% said "the growing difficulty in introducing technology," and 16% said "problems relating to export control laws." Problems over intellectual property rights were brought up more than other problems, which is thought to express the uneasiness of firms.

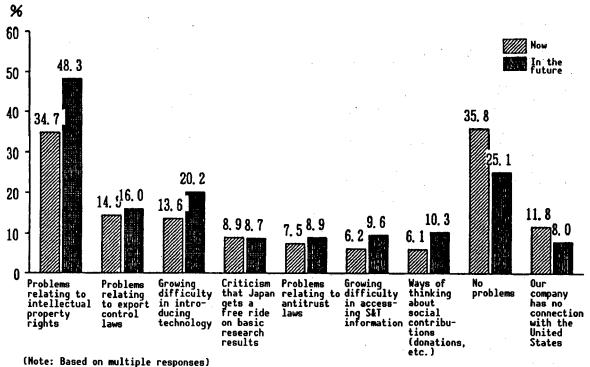


Figure 41. S&T-Related Problems in Relationships With the U.S.

High percentages of those types of industries in which Japan has strong technological power answered that there are now and will be in the future "problems relating to intellectual property rights." For example, that was cited by over 50% of the firms in the communications, electronics, and electrical measuring instruments industry (72% now, 84% in the future), the precision machinery industry (57%, 61%), and the electrical machinery and appliance industry (53%, 59%). A much higher than average percentage, 38%, of firms in the communications, electronics, and electrical measuring instruments

industry also said that there are and will be "problems relating to export control laws." And, pharmaceuticals firms, whose R&D strength is less than that of the United States and Europe, said that "the growing difficulty in introducing technology" is a problem (28%, 37%).

(3) Items for Which the Existence of a Worldwide Common Base in R&D Activities Is Desired

There are many problems that should be solved, such as the increase in the occurrence of trouble with other countries over intellectual property rights and the various problems with the United States. We asked firms about items for which it would be more desirable if there were a common, worldwide base in the R&D activities in which Japanese firms take an active part internationally. The largest number, 65%, answered "an intellectual property rights system," followed by 38% that said "product standards," 20% that said "product liability," and 19% said "environmental regulations." There are very many firms that want to see a stabilized intellectual property rights system (Figure 42).

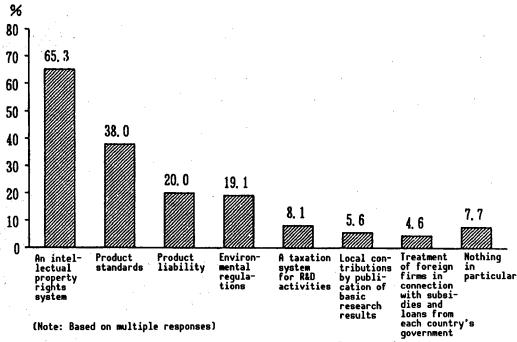


Figure 42. Items for Which the Existence of a Worldwide Common Base in R&D Activities Is Desired

(4) R&D in Connection With Global Environmental Problems

Global environmental problems exemplified by the increase in the concentrations of carbon dioxide in the atmosphere, the destruction of the ozone layer by CFCs, desertification, and so forth are now being taken up as worldwide issues. R&D in connection with global environmental problems is an issue for all of humanity, and firms too are trying to find the best ways to take on R&D activities that have to do with global environmental problems.

When we asked firms about the state of their implementation of R&D (technology development) to help solve global environmental problems, 33% answered that they "are doing such R&D," 15% said that they are "investigating such R&D," and 52% said that they "are not doing such R&D." Already one-third of firms are carrying out some sort of R&D to deal with global environmental problems. By scale of capital, there is a trend where the firms with the larger amounts of capital tend do more of that kind of R&D. Almost four-fifths, 77%, of firms with ¥50 billion or more in capital are already doing such R&D. By type of industry, there are large percentages of automobile firms and pulp and paper firms doing this kind of R&D.

We asked firms that answered that they "are doing such R&D" or "are investigating such R&D" about what sort of target R&D they are thinking of and about how their R&D relates to the global environmental policies that the governments countries are implementing. More than half of the firms. 55% of them, answered that they are "developing technology for coping with

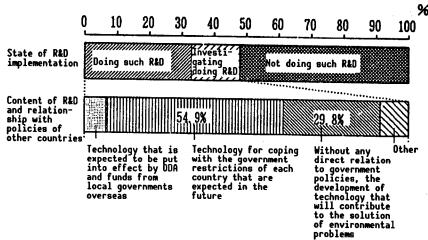


Figure 43. State of Private Firms' R&D (Technology development) for Solving Global Environmental Problems

the government restrictions of each country that are expected in the future," 30% said "without any direct relation to government policies, the development of technology that will contribute to the solution of environmental problems as a result of the effective utilization of tropical forests, more efficient recycling, etc.," and only a mere 7% said "technology that is expected to be put into effect by ODA and funds from local governments overseas." Firms are continuing to build up their R&D in the anticipation that governments will intensify legal regulations in order to deal with global environmental problems; we can gather that firms are not aiming at public category measures such as governmental ODA and projects that involve environmental measures. It is also noteworthy that 30% of firms are carrying out or are investigating the development of technology that will contribute to solving global environmental problems even if there is no direct connection with governmental policies (Figure 43).

Japanese firms have demonstrated their high level of R&D capabilities and have a past record of coping with common, public issues, as exemplified in their having managed to surmount the restraints imposed by strict regulations on automotive gas emissions. In order to make the most of Japanese firms' R&D power in dealing with global environmental problems, maintenance of the environment surrounding firms will become an important pillar of government

policies. In view of this, we asked how the state of affairs surrounding the activities of firms should change in order for firms to contribute better, whether directly or indirectly, towards solving global environmental problems by means of R&D. We asked the question separately with respect to the situation in Japan and the international situation.

With respect to the state of affairs in Japan, 31% answered that they would like to see an "expansion of the nation's support for R&D, e.g., subsidies, a tax-deduction system," 31% said "imparting the right knowledge to the citizens of Japan and raising their consciousness," and 20% said "rethinking Japan's legal regulations and other such systems." Firms have hopes about government assistance in the way of support systems for capital and in getting people excited about the issues (Figure 44).

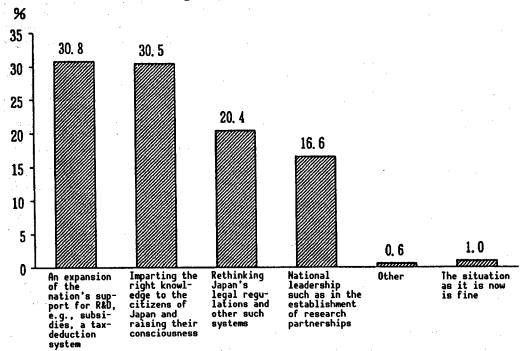


Figure 44. Changes in the Domestic Situation Surrounding Firms in Order for Them To Contribute to Solving Global Environmental Problems

With respect to the international state of affairs, 27% answered that they would like to see "the standardization of legal regulations and other such systems because those systems differ depending on the country," 23% said "leadership from the advanced countries, 22% said "mutual understanding with respect to the differences depending on the country," and 20% said "the smooth promotion of international joint research." We see that firms expect the standardization of international regulations and systems, and mutual understanding (Figure 45).

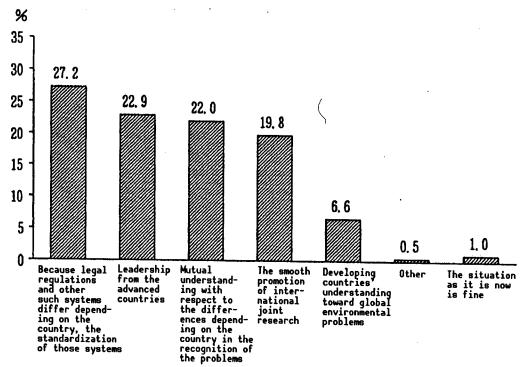


Figure 45. Changes in the International Situation Surrounding Firms in Order for Them To Contribute to Solving Global Environmental Problems

IV. Aggregate Results of Survey (Summary)

I. Summary of Firms' Responses

1. Sales and R&D Expenditures

By type of industry			
Classification	Sales	Research	Research
	(¥100 million)	expenditures (¥ million)	expenditures/ sales (%)
Total	2.077.555	7.402.161	3.56
(1) Agriculture, forestry, and fisheries (2) Mining (3) Construction (4) Food processing (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (1 0) Pharmaceuticals (1 1) Other chemicals (1 2) Petroleum and coal products (1 3) Plastic products (1 4) Rubber products (1 5) Ceramics (1 6) Iron and steel (1 7) Nonferrous metals (1 8) Metal products (1 9) Machinery (2 0) Electrical machinery and appliances (2 1) Communications, electronics, and electrical measuring instruments (2 2) Automobiles (2 3) Other transport machinery (2 4) Precision machinery (2 5) Other industries (2 6) Transportation, communications, and public utilities (2 7) Other types of industries	13,589 2,115 247,889 93,489 23,092 28,832 20,075 79,524 6,106 38,921 48,011 117,951 18,510 8,364 33,247 97,473 43,085 18,504 108,241 263,600 94,323 297,589	5,110 2,116 297.710 98.342 50.524 143.619 17.361 349.829 17.791 427.309 205.726 97.969 63.029 22.584 113.095 24.351 570.997 1.703.866 810.050 1.064.727	.38 1.00 1.20 1.05 2.19 4.98 .86 4.40 10.98 4.283 3.41 2.70 3.406 1.93 1.32 5.28 6.46 8.59 3.58 4.03 6.70 2.13 1.79 2.04
By scale of capital	Sales	Research	Research
Classification	(¥100 million)	<pre>expenditures (¥ million)</pre>	expenditures/ sales (%)
Total	2.077.555	7.402.161	3.56
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5)More than ¥100 billion	161.801 176.117 593.040 354.435 792.162		2.37 2.16 3.56 3.22 4.27

2. Research Expenditures by Nature of the R&D

By type of industry				•
Classification	Research expenditures	Basic research expenditures	Applied research expenditures	Development research
Total	(¥ million)	(¥ million)	(¥ million)	expenditures (¥ million)
iorat	7,402,161	392.243	1.343,336	4.089.658
(1) Agriculture, forestry, and fisheri	es 5,110	299	1.369	1.552
(2)Mining	2.116	48	483	392
(3)Construction	297,710	8. 230	43.610	201,735
(4) Food processing	98,342	10.078	31.064	40.383
(5)Textiles	50.524	3,569	9.585	27.528
(6)Pulp and paper	143,619	2.670	30,161	108,537
(7)Printing and publishing	17,361	1.021	4.495	11.845
(8) Synthetic chemicals	349.829	29.930	105.052	213.934
(9)0ils, fats, and paints	17,791	350	3,344	5,825
(1 0) Pharmaceuticals	427,309	75.352	97,837	211.131
(11)Other chemicals	205,726	11.896	47,772	87.982
(1 2) Petroleum and coal products	97,969	15, 201	32,124	50,644
(1 3) Plastic products	63,029	4,950	17.818	39,222
(1 4)Rubber products	22,584	1.088	6,052	15,444
(15)Ceramics	113,097	10,621	32,266	67,809
(16)Iron and steel	269.025	38.870	55,945	172.988
(17)Nonferrous metals	83,050	4.497	21,484	58.089
(1 8)Metal products	24,351	258	4,057	19.456
(19)Machinery	570,997	36, 106	95,511	409,198
(2 0) Electrical machinery and appliance	8 1,703,866	34.008	271.548	568,260
(21)Communications, electronics, and	810,050	54.407	130,600	623.478
electrical measuring instruments (2 2) Automobiles				
	1,064,727	21.209	186.826	813,242
(2 3)Other transport machinery (2 4)Precision machinery	196,777	7.077	15,328	62,163
(25)Other industries	237.271	10,476	29,183	145,466
(26)Inappropriation communications	40.258	351	8.901	18.380
(26) Transportation, communications, and public utilities	458.081	8,776	50.509	94.690
(27)Other types of industries	31,592	905	10.402	20.285
By scale of capital Classification	Research expenditures	Basic research	Applied research	Development research
Classification		expenditures	expenditures	expenditures
	(¥ million)	(¥ million)	(¥ million)	(¥ million)
Total	7.402.161	392.243	1,343,336	4,089,658
(1)¥1 to 5 billion	382.893	27.862	78.544	249.735
(2)¥5 to 10 billion	379,820	32.797	84.148	225,103
(3)¥10 to 50 billion	2.111.337	123.333	466.467	1.287.221
(4)¥50 to 100 billion	1,142,432	68,550	253, 107	711.860
(5) More than ¥100 billion	3,385,679	139,701	461,070	1.615.739

3. Number of Employees and Full-Time Researchers

By type of industry			
Classification	Number of employees	Number of full-time researchers	Number of full-time researchers/ employees (%)
Total	3,399,338	214.921	6.32
(1) Agriculture, forestry, and fisheries (2) Mining (3) Construction (4) Food processing (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (1 0) Pharmaceuticals (1 1) Other chemicals (1 2) Petroleum and coal products (1 3) Plastic products (1 4) Rubber products (1 5) Ceramics (1 6) Iron and steel (1 7) Nonferrous metals (1 8) Metal products (1 9) Machinery (2 0) Electrical machinery and appliances (2 1) Communications, electronics, and electrical measuring instruments (2 2) Automobiles (2 3) Other transport machinery (2 4) Precision machinery (2 5) Other industries (2 6) Transportation, communications, and public utilities (2 7) Other types of industries	9.114 4.144 271,164 112,802 63.019 43.425 26.448 117.712 9.687 97.733 69.458 37.033 27.837 20.650 61.526 176.356 66.884 476.085 199.898 379.342 97.585 86.445 34.206 601.014	113 102 4.858 4.421 3.387 1.770 1.754 14.746 1.300 11.657 9.265 2.192 2.260 1.657 2.955 4.562 3.364 2.112 20.450 50.322 27.347 26.883 3.258 7.852 1.667 4.983 1.184	1.24 2.46 1.79 3.92 5.37 2.92 2.85 12.53 13.42 11.93 13.34 5.92 8.12 8.02 4.80 2.59 5.03 4.41 8.87 10.57 13.68 7.09 3.34 9.08 4.87 .83
By scale of capital			
Classification	Number of employees	Number of full-time researchers	Number of full-time researchers/ employees (%)
Total	3,399.338	214.921	6.32
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5)More than ¥100 billion	310.092 367.925 960.833 441.371 1.319.117	14.396 17.890 67.895 43.295 71.445	4.64 4.86 7.07 9.81 5.42

4. Number of Full-Time Researchers and R&D Expenditures

By type of industry			
Classification	Number of full-time researchers	R&D expenditures	R&D expenditures/
	researchers		full-time researchers
•		(¥ million)	(¥10,000)
Total	214.921	7,402.161	3,444.13
(1)Agriculture, forestry, and fisheries		5.110	4,522.12
(2)Mining	102	2.116	2,074.51
(3)Construction (4)Food processing	4,858	297.710	6.128.24
(5) Textiles	4,421 3,387	98.342 50.524	2,224.43 1,491.70
(6)Pulp and paper	1.270	143.619	11.308.58
(7)Printing and publishing	754	17.361	2.302.52
(8) Synthetic chemicals	14.746	349.829	2.372.37
(9)0ils, fats, and paints	1.300	17.791	1,368.54
(10)Pharmaceuticals	11.657	427,309	3,665.69
(11)Other chemicals	9,265	205.726	2.220.46
(12)Petroleum and coal products	2.192	97.969	4,469.39
(13)Plastic products	2.260	63,029	2,788.89
(14)Rubber products	1.657	22.584	1.362.95
(15)Ceramics (16)Iron and steel	2,955	113.097	3,827.31
(17)Nonferrous metals	4,562 3,364	269,025 83,050	5.897.08 2,468.79
(1 8)Metal products	2,112	24,351	1,152.98
(19)Machinery	20,450	570,997	2,792.16
(20) Electrical machinery and appliances	50.322	1,703,866	3,385.93
(21)Communications, electronics, and electrical measuring instruments	27.347	810,050	2.962.12
(2 2)Automobiles	26,883	1.064.727	3,960.60
(23)Other transport machinery	3.258	196,777	6,039.81
(2 4)Precision machinery	7,852	237.271	3.021.79
(25)Other industries	1.667	40.258	2.415.00
(26)Transportation, communications, and	4.983	458,081	9,192.88
public utilities (2 7)Other types of industries	1,184	31.592	2,668.24
The tradition of the state of t	1,104	01,000	2,000.21
By scale of capital Classification	Number of	R&D	R&D
Classification	full-time		expenditures/
	researchers		full-time researchers
		(¥ million)	
Total	214.921	7,402,161	3,444.13
(1)¥1 to 5 billion	14.396	382.893	2,659.72
(2)¥5 to 10 billion	17.890	379,820	2,123.09
(3) ¥10 to 50 billion	67,895	2.111.337	3.109.71
(4)¥50 to 100 billion	43,295	1.142.432	2.638.72
(5) More than ¥100 billion	71,445	3.385,679	4,738.86

5. Number of Patents Held and Number of Non-Japanese Researchers

	Number of patents held in Japan	of s held an		Number or patents outside	of held Japan	Number of non-Japanese researchers	of Janese Shers
Total	368,	964	•.	273	997	6 8	က္
		•				* ,	•
(])Agriculture, forestry, and fisheries			•)
(2) Wining	t	χ) •		•	N	•	> 0
(3) Construction	_	4		-	>		ית
•	რ	4		က်	—		م
(5) Textiles	4	<u>-</u>		က်	4		0
(6) Pulp and paper	7			-			2
(7) Printing and publishing	8	ω		<u></u>	9		~
(8)Synthetic chemicals	4 0.	0		32,	ເດ	~	~
(9) Dils, fats, and paints	-	တ		<u>-</u>	ဗ		က
(10) Pharmaceuticals	W	ဖ		20.	Ŋ	ന	0
(11) Other chemicals	1 1,	0			ည	_	ന
(12) Petroleum and coal products	က်	တ		က်	2		က
(13) Plastic products	4,	4		2,	ന		0
(14) Rubber products	-	4		<u>-</u>	~		_
(15) Ceramics	4.	0		က်	က		! ~
(16) Iron and steel	18,	4		တ်			ത
(17) Nonferrous metals	10.	O		ເດົ	თ	1 6	∞
(18) Metal products		ဖ		1.	თ		
(19) Machinery	19,	0		- 1	4	∞.	ത
(20) Electrical machinery and appliances	9 5	102		57.	0 1 4	0	က
(21) Communications, electronics, and electrical measuring	monte 44.	~		-	ത (_	0
(22) Automobiles		<u>ب</u>			00 (∞ ı
(23) Other transport machinery	0.	o			i Q		ာ ဇ
(24) Precision machinery		0		22.	D (က -	တ
	4.	(7	N.	→ •	رود
(28) Transportation, communications, and public utilities		ကျ		m	– 1	S)	4.
(27) Other types of industries	_	Ŋ			ည		7
By scale of capital	0	L.C		- -	c	ĸ	ď
(2) ¥5 to 10 billion	4	ာ ထ			11-) 4	0
(3) ¥10 to 50 billion		0			4	က	0
(4) ¥50 to 100 billion	89	699		က တ (255	φ.	~ (
(5) More than ¥100 billion		ဂ			ת		>

Sales and R&D Expenditures of Overseas Affiliated Firms (II.) and Number of R&D Strongoints Overseas (IV Direction 1)				
	ales of ffiliato (¥ mi	overseas ed firms llion)	R&D expenditures of overseas affiliated firms (* million)	Number of R&D strongpoints overseas
Total	8, 815	986	367,910	276
By type of industry				
(]) Agriculture, forestry, and fisheries		0	0	C
(2) Mining		S	• 0	0
(3) Construction	6	4	0	0
(4) Food processing		4	~) - -
(5)Textiles	4	0	~	r
(G) Pulp and paper	2 .	4	۰-	- 0
(7) Printing and publishing		2	• •	1
(8) Synthetic chemicals	797	9	ď	
(9)0ils, fats, and paints	1	0	, c	- ∝
(10) Pharmaceuticals	ന	o,		
(11) Other chemicals		4	5.66.1	0 0
(12) Petroleum and coal products	7	0		
(13) Plastic products		∞	oc	10
(14) Rubber products		0	ę,	, c
(15) Ceramics	4	0	40.067	i cr
(16) Iron and steel		∞	•	יט כי
(17) Nonferrous metals		∞		· -
(18) Metal products		4	000	٠ ، ر
(19) Machinery	3	7	7, 29	
sac	. 87		1, 13) (C
(21) Communications, electronics, and electrical measuring	1.814	105	31,520	6
	გ	4	2, 71	
(23) Other transport machinery	09	က	0	1 3
(24) Precision machinery	0	N	32	
	00.		1, 70	4
(26) Transportation, communications, and public utilities	30	0	10,000	.0
(27) Other types of industries		4	0	• • • •
By scale of capital	•	1	1	
() *I to 3 billion (2) *5 to 10 hillion	2.4.0 0.0			
(3) ¥10 to 50 billion		ე დ - rc	7.46	
(4) ¥50 to 100 billion	9,676,	22.00	164, 128	o o o
(3) More than #100 billion	7 7 .	က	6, 32	

Number of Joint Research Efforts by Overseas R&D Strongpoints (IV. Question 8), No. of Non-Japanese Researchers by Nationality

	Number	of joint		Number of	non-Japanes	non-Japanese researchers,	s, by nationality	onality		
	researci by overs	n errorts Beas R&D	United	United States	Western Europe	Europe	Asia	m	Ö	Other
	strongpoints 5 yrs Nov	oints Now	3 yrs	No.	3 yrs	Nos	3 yrs aqo	Nos	3 yrs ago	Nos
Total	7.3	214	7.4	1 8 9	, 4	1 2 5	8.7	397	1 0	4 0
By type of industry		•	•			ı I				
(1)Agriculture, forestry, and	0	0	0	0	0	0	0	0	0	0
(2) Mining Lisher Les	0	0	0	0	0	0	0		0	0
(3)Construction	0	0	က	က			11	2 2	0	0
(4)Food processing	_	2.2			က	က		∞	0	ö
(5)Textiles	• •	_	· C	0	0	0		0	0	0
(6) Pulp and paper	· C	· C	·	· –	0	0		-	0	0
(7) Printing and publishing	o C	o C	· C	•0	0	0		က	0	0
(8)Synthetic chemicals	· C	000	· C	ന	2	ιĊ	10	23	0	0
(9) Oils, fats, and paints	c) -	0	0	2	9	က		0	4
(10) Pharmaceuticals	o 07:	30	4	7	_	6	∞	1 2	7	-
(11)Other chemicals	· C	2	က	Ŋ	2	0	9	1 2		7
(12) Petroleum and coal products	0	0	0	0	0	0		ო	0	0
(13) Plastic products	c	0	-	0	0	0	0	0	0	0
(14) Rubber products	0	0	0	0	0	0	0	,- -	0	0
(15) Ceramics	0	4	0	0	0	0	,- .4	ဖ	0	,4
(16) Iron and steel	0	~	7	2	-	2	2		0	0
(17) Nonferrous metals	10	2.5	8	4		4	မ	3.7	4	7
(18) Metal products	0		0	0	0	0	0	0	0	0
(19) Machinery		2.7	3.4		က	7	ເດ	9 0	0	0 (
appliances	ın	1 8	7		∞	47	ဖ		۰	, ,
(21) Communications, electronics, electronics, electroments	မ		9	1 6	~ (0 0	0	0 0	~ ~	- 5
(22) Automobiles (23) Other transport machinery	9 2	4	4. (-	7 -	v) -	⊃ ₹	> ¢	n C
(24) Precision machinery	> c) (90	‡ (1	- [-	1 7	→ 00	* ec	0	0
(25) Other industries	70	– લ	4 C	o C	- c	r C)		0	0
(26) ransportation, communications, and communications	o C	0 0	o	0	,		0	~	. –	9
(27) Other types of industries	0	0	10)	0			ന	0	0
By scale of capital			1		•				-	c
(1) ¥1 to 5 billion		27	ທ -	4 0		∞ « ⊶	 (r)	ა 4 ა დ		9
(Z) \$5 to 10 billion			† ,		- o	~			· 67	er.
(3) ¥18 to 58 billion	N C		† ′	4. c	c ▼ -	4 O L-	20		9 4) -1
(4) ¥58 to 188 billion			6. 4		1 2	4 9			-	10
(5) More than \$100 billion	•))					

Number of Researchers Sent, Received and Number of Joint Research Efforts With Foreign Countries by Strongpoints in Japan (V. Question 6)

				(V. Question 6)	-
No.	Non-Japanese researchers accepted as trainees	Non-Japanese researchers accepted as part of mutual dispatching	Japanese research- ers sent to foreign countries	Number of josefforts with countries by in Japan	joint research th foreign by strongpoints
Total	ა გ	7.5	0.05	5 yrs ago	Now 1. 7.7.3
By type of industry)		•)	
(])Agriculture, forestry, and		0	0	ເດ	
(2) Mining	. ~)	• œ	c	
(3)Construction	2.2				-
(4) Food processing				+ C	
(5) Textiles	٥ (- C	o (4		
(6) Pulp and paper	1 C	o c) C	
(7) Printing and publishing	0) C		-	
(8) Synthetic chemicals	- -		* ~	· ·	ο α -
(9) Oils, fats, and paints) C	ວແຕ			
(10) Pharmaceuticals) (o w		υ 1 α	
(11)Other chemicals	σ -	0 6			
	ന ന 4	10	o) c	+ C
m	0	1 -			
(14) Rubber products	1		n o		
(15) Ceramics		o en	7.0		
(16) Iron and steel		3 6			
(17) Nonferrous metals		J. C) (r	7 6
(18) Metal products		00			
(19) Machinery	> 4 1 €	0 -			
appliances		0			
(21) Communications, electronics,		თ			65
(22) Mutomobiles (23) Other transport machinery	2 4	6.7	0 0 0	136	184
(24) Precision machinery	п 4. С	Ö			
(25) Other industries					
(26) Fransportation, communications,	ά 4 α) r			
(27) Other types of industries	o 6	- C	0 0 0 0		- 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5
By scale of capital		ò			
(1) #1 to 5 billion		7			4
(2) ¥5 to 10 billion	ω ;	1 0	133	100	208
(3) ¥10 to 50 billion					Ŋ
(4) #50 to 100 billion		2 1			ທ
() / More than #100 billion			4		-

III. Perception of International Situation in Relation to S&I

Question 1.	Compariso	Comparison of R&O strength with that of	ngth wit		U.S. and Europe,	Europe,	5 years ago	obi				
By type of industry	No. of firms surveyed	Frequency (total value)	Japan>U.S.) Europe	J.S.) ope	Japan>Europe> U.S.	urope)	U.S.) Ja Europe	U.S.)Japan) Europe	U.S.>Europe> Japan	ırope)	Europe) Japan U.S.	Japan
Firms responding Frequency (total value)/Lateral percentage	831 831	782 782.00	12	9.21	33	4.99	78	9.97	011	14.07	34	4.35
(1) Agriculture, forestry, and fisheries (2) Mining (3) Construction (4) Food processing (5) Textiles (5) Textiles (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Phermaceuticals (11) Other chemicals (12) Petroleum and coal products (12) Petroleum and coal products (13) Plastic products (14) Rubber products (15) Geramics (16) Iron and steel (17) Nonferrous metals (18) Metal products (18) Metal products (18) Metal products (18) Ecctrical machinery and appliances (20) Electrical machinery and appliances	W 40000m0	6446188611841863428116	000000-040080000	0.00 1.1.5 1.1	00000000000	30.00 30.00 30.00 1.73 26.00 26.00 26.00 26.00 26.00 26.00 27.00 28.00 28.00 28.00 28.00 29.00 20.	00000m-nnonononnn	00000000000000000000000000000000000000		33.33.33.33.33.33.33.33.33.33.33.33.33.	008-0-0-080-088	0042444 000000000000444 000000000000000
(2 1) Communications, electronics, and electrical measuring instruments (2 2) Automobiles (2 3) Other transport machinery (2 4) Precision machinery (2 5) Other industries (2 6) Transmortation communications and	20 F8 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	21.21.83 4.0 21.21.83 4.0		13.51 16.67 14.29 0.00	· • • • • • • • • • • • • • • • • • • •	11.11 4.76 4.16			o mn⊣no	16.22 6.98 11.11 4.76 21.43		0.00 13.95 9.52 9.52 12.50
ies industries	17 Companison	17 of R&N	0 0.00 atremeth with that	0.00 th that of	Pue	0.00	1	S. 88 88	m	17.65	2	11.76
by scale of capital	No. of firms surveyed	Frequence (total	Japan>U.S.> Europe		 - -	urope)	•	U.S.)Japan) Europe	U.S.>Europe> Japan	ırope)	Europe U.S.	Europe>Japan U.S.
Firms responding Frequency (total value)/Lateral percentage	831 831	782 782.00	12 12	9.21	5 65 5 65 5 65	4.99	200	9.97	22	14.07	, e	4.35
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	290 186 229 41 36	2112	10.69 7.53 9.17 2.44 13.89	4 -100 4	4.83 5.91 4.37 0.00	248	11.38 11.29 7.86 9.76 5.56	8241 84108	11.03 12.90 17.90 24.39 8.33	202	5.17 2.06 2.44 2.44

Comparison of R&O strength with that of U.S. and Europe, 5 years ago

By type of industry	No. of firms surveyed	Frequency (total value)	Europe Japan	Europe>U.S.) Japan	Japan)U.S.= Europe	U. S. =	U.S.)Japan= Europe	=ued	Europe) U. S.	Europe>Japan= U. S.	Japan=U.S.> Europe	U.S.)
Firms responding Frequency (total value)/Lateral percentage	831	782 782.00	22	5.37	77	6.01	000	7.67	∞ ∞	2.30	35	6.91
(1) Agriculture, forestry, and fisheries	נט	m	0	0.00	-	33.33	Ĺ	33.33	0	0.00	0	0.00
(2) Fonetcurtion	→ 6	₹.	4	25.00	01	9.0	۰,	0.0	٥.	0.6	0:	0.0
(A)Food processing	25	¥ 4	→ ~:		- ~	. u	•	 	c	~. ?.	u	9.46
(5) Textiles	92	21	, —	4.76	က	14.29	•0	9.0	· ~	9.52	s ~	9.52
(6)Pulp and paper	<u>61</u> °	<u></u>	→ «	22.22	0	9.6	~	11.11	۰.	5.56		5.56
(//rrinting and publishing (8)Synthetic chemicals	າ 29	57.	> ~	1.75	> ~	3.51	- w	0.00 8.77	- 8	33.33	0 m	o. v.
(9) Oils, fats, and paints	=;	=:	¢	9.0	0	9.6	· en (27.27) ,	60.6	0	.0
(10)Pharmaceuticals (11)Other chemicals	3 K	20 co	7	2.26	-	0.00	7 9 vs	5.26	⊸ c	2.63	~	2.63
(12)Petroleum and coal products	<u></u>	:=:	· 679 (17.65	.0	0	0	00	• •	68	. 0	
(I 3) Plastic products (I 4) Rubber products			5 8	33.33	N C	0.00	m –	16.67	0	s. c	% C	
(15)Ceramics	33	32	0	0.0	6	18.75	~ ~ ~	6.25	,	3.13	. ~	3.13
(16)Iron and steel	9 8	₩ 6	-	9.6	ره در	14.71	o	0.00	00	88	~	5.88
(1 8)Metal products	23	22	~ ~	9.09	a es	13.64	. 0	18	~	9.08	,	4.55
(19) Machinery	<u>.</u>		~	6.56	vs e	8.20	~ (6.56	(1.64	(1.64
(2.0)tlectrical machinery and appliances (2.1)Communications alectronics and	• on	3,00	• 0	, o	2 62	2.50	יים רכ	8.11	>	88	5 7	11.25
electrical measuring instruments					,			;	~	4.65	· e>	6.98
(22)Automobiles	C :	£3.	~	4.65	0	0.00	es .	6.98	 <	5.56	 .	5.56
(2 3)Uther transport machinery (2 4)Precision machinery	2 T R	218	m 0	16.67	۰ ۵	9.6	 C	2.28 0.00		38	~ ~	14.79
(2 5)Other industries	=	1	. ~	14.29	٠	7.14		6.6	•	9.0		4:17
(26) Transportation, communications, and	56	72	•	0.0	0	0.0	~	æ. 33	-	5. 88	-	5.88
public utilities (2.7)Other types of industries	11	11	~	11.76	0	0.00	-	5.88				
By scale of capital	Compariso	Comparison of R&O strength with that of	ength with	that of U	U.S. and Europe,	Europe, 5	years ago	Ġ				
	No. of firms surveyed	Frequency (total value)	Europe>U.S.> Japan	. Y. S.)	Japan)U.S.= Europe	J. S. =	U.S.)Japan= Europe	=ued	Europe) Japan= U. S.	Japan=	Japan=U.S.) Europe	1.5.)
Firms responding Frequency (total value)/Lateral percentage	831 831	782 782.00	22	5.37		6.01	909	7.67	188 188	2.30	25.55	6.91
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	240 240 345 395	290 186 229 41 36	22.400 00.400	48.00 6.00 11.00 0.00	2055	5.3.5.5 5.3.5.8 5.3.8 5.		6.21 8.30 12.53 22.22	L4L00	2.15 0.00 0.00 0.00	2254 s	

Comparison of R&D strength with that of U.S. and Europe, 5 years ago

By type of industry	No. of firms surveyed	Frequency (total value)	Japan= U.S.	Japan=Europe) U.S.	U.S.=1 Japan	U.S.=Europe) Japan	Japan=U.S Europe	U. S. =	Don't	Don't know
Firms responding Frequency (total value)/Lateral percent	831 831	782 782.00	21	2.69	75 75	9.59	86	11.51	22	5.37
7	. '	•	•	;	•		•		•	
(1) Mgriculture, Torestry, and Tisher (2)Mining	ب	m -	-		-	88	-		- C	9.6
(3)Construction	28	7,	• •	900	s va	6.76	' =		9 07	12.16
(4) Food processing	88	9	-	2.17	6	13.04	~		w	10.87
(5) extiles	92	12.	00	9.0	e> c	9.52	m -	٠,	~ <	9.52
(7)Printing and publishing		× ~	>		~ c	100			-	
(8) Synthetic chemicals	29	57	•	1.75	`=	19.30	. 🛶	·~	~~	3.51
(9) Oils, fats, and paints	==	-10	0	8.6		9.09	c		۰-	9.0
(1 1)Other chemicals	20 CC	34	-		3 ~	2.88	> v 7			0.00
			•	0.00	-	5.88	· ·		-	88
(1 3)Plastic products (1 4)Rubber products	~	8	-	86	N C	11.1	 -		د -	16.00
	22.0	32	>	3.13	9 64	6.25	- L O			3.13
	98	35	٦.	2.94	~ 6	 88.	s ·	14.71	→ 6	11.76
(18)Metal products	3 e	20	p	6.43	7 4	20.00	€ 673		7	
9) Machinery	25	61	ω.	8.6	•	6.56			. ~	3.28
(2.0)Electrical machinery and appliance (2.1)Communications electronics and	₹0	80	 <	1.25	က	3.15	75		თ	3.75
electrical measuring instruments	ŝ	5	•		•	;	•	•	•	
(2 2) Automobiles	ς:	<u>ئ</u>	67 -	۵,	❤ ‹	w.c	- -	•		
(2 3)Uther transport machinery (7 4)Precision machinery	8 7 2	18	~	ů.	> ~	2 62	-			
(2 5)Other industries	:=	:=	. 0	0.00	0	14.29	-	•	0	0.00
(26) Transportation, communications, ar	92	74	~	<u>ښ</u>		~	00	•	m .	
public utilities (2 7)Other types of industries	11	17	•	0.00	~	11.76	m	17.65	-	5.88
	Comparison	of	R&D strength with that	h that of	U.S. and	Europe,	5 years	obe		
By scale of capital	No. of firms surveyed	Frequency (total value)	Japan=Europe) U.S.	urope	U.S.=E Japan	U.S.=Europe> Japan	Japan=U.S Europe	.S.=	Don't know	know
Firms responding Frequency (total value)/Lateral percent	888	782 782.00	21	2.69	75	9.59	86	11.51	727	5.37
	308	290	•	3,10	27	9.31	35	12.07	22	7.59
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More +bay ¥100 billion	0-4 0044 0000	228 413 8113	Brosed	22.18 0.00 0.00	1220	10.75 10.92 4.88 2.78	Q 7 3 55	11.83 10.04 9.76 16.67	27	24.38
יאן שמוב רוופנו בדתת הדדדתונ							,			

Comparison of R&O strength with that of U.S. and Europe, now

By type of industry	No. of firms surveyed	Frequency (total value)	Japan	Japan>U.S.> Europe	Japan) U.S.	Japan>Europe> U.S.	U.S.) Europ	U.S. >Japan> Europe	U.S.>Europe> Japan	rope)	Europe U.S.	Europe)Japan U.S.
Firms responding Frequency itotal value]/Lateral percentage	831	804 804.00	116	14.43	99	8.21	⇔ ∞	5.97	5 5	5.60	52	3.11
	•	•	•	•	•	•	•	•	•	3	•	;
(1)Hgriculture, torestry, and fisheries (2)Mining	n ¬	~	> C	90	> C	200	> 0	90.0		25.25	> .c	36
(3)Construction	- C	5	2	12.66	• **	3.80	ω (2.59	• 64	2.53	~	2.53
(4) Food processing	នន	. *	2	4.17		2.08	~	6.25		0.00	د	2.08
(5) Textiles	5 6	23	7	8.70	က	13.04	0	0.00		4.35	~	13.04
(6) Pulp and paper	<u>5</u> ,	≅ '	~	11.11	٥.	00.00		5.56	 •	5.56	~	11.11
(7) Frinting and publishing	~ £	m 0	o v	9.°	 ~	33.33	5 (7	0.00 0.00	-	2.00	۰ د	0.00
(0) Synchetic Chemicals	7 =	0	-	50.0	٠.	000	-	500		60.6	1 C	200
(10) Pharmaceuticals	38	30.		2.63	0	0.00	~ ~	5.26	· Ø	23.68	•	9
(1 1)Other chemicals	35	₹:	~ ·	20.59	⊶.	2.94	~		es (8. 8. 8. 8. 8.	 4 •	2.94
(1 2)Petroleum and coal products	∞ •	71	۰ د	16.00	→ •	% <u>-</u>		, r 8, r 8, r	ۍ د	32.29	⊶ ∈	
(14)Rubber products	္ခမ	9 9	. 0	0.0	10	9.0		16.67	• •	88	-	000
(1 5)Ceramics	32	32	9	18.75	_	3.13	-	3.13	-	3.13	~	6.25
(16) Iron and steel	ဗ္ဗ	36	~ (11.13		36.11	۰.	S:	6	2.78	0	9.6
(1 /)Nonferrous metals	2) (- م	00.02	⊸ 6	8. 53 50 50 50 50 50	% C	20.0	∾ ∈	, c	-	6.6 6.8
(1 0)Machinery	2 4	77	~ 00	13.11	12	19.67	• •••	26.4	> ~	3 2	- 6	
(2 0)Flectrical machinery and appliances	~	22	· 82	21.95	12	12.20	ω.	7.32	۰ م	2.44		2.44
(21)Communications, electronics, and	39	39	11	28.21	0	0.00	ø	15.38		2.56	Ö	0.0
electrical measuring instruments									•		•	:
(2 Z)Hutomobiles	- :	5.	=	24.44	→ (∞ -	~	- 0	> ~	3	~ C	:
(2 4)Precision machinery	27	23.0	o	26.09	4 m	13.04	> ~	4.35	.0	0.0	.0	9.0
	: :=	=	· 120	21.43		~	•••	7.14	•	0.00		7.14
(2 6) Transportation, communications, and	56	52	~	8.00	_	8.7	_	4 .00	•	0.00	P)	12.00
(2 7)0ther types of industries	11	11	-	5.88	2	11.76	~	11.76	~	11.76	0	0.00
By scale of capital	Comparison	of R&D	strength with that	th that of	u.s.	and Europe, now	. 3					
	No. of	Frequency	Japan	Japan>U.S.>	Japan)	Japan>Europe>	U.S.	U.S. > Japan>	U.S. >Europe	Lobe	Europe	Japan
	surveyed	value)	;	<u>{</u>			Euro	ā	Japan		U.S.	U.S.
Firms responding Frequency (total value)/Lateral percentage	831 831	804 804.00	116	14.43	99	8.21	** **	5.97	45 45	5.60	22 25	3.11
(1)¥1 to 5 billion (2)¥5 to 10 billion	308	300	25	15.67	26	8.8.5	25	9.80	9 2 2 5	3.00	096	3.13
(3)*10 to 50 billion (4)*50 to 100 billion (5)More than ¥100 billion	38 28	36 36	, , ,	17.14	9	2.38 16.67	o vo es	11.8 8.33 8.33	3-0	2.52 2.52 2.56		22.38

Comparison of R&O strength with that of U.S. and Europe, now

By type of industry	No. of firms surveyed	Frequency (total value)	Europe	Europe)U.S.) Japan	Japai	Japan>U.S.= Europe	U.S.) J. Europe	U.S.)Japan≖ Europe	Europ U. S.	Europe>Japan= U.S.	Japan=U Europe	Japan=U.S.> Europe
Firms responding Frequency (total value)/Lateral percentage	831	804.00	16 16	1.93	22	9.20	99	5.72	233	2.86	88	11.19
						;		;	•			. :
(1)Agriculture, forestry, and fisheries	س -	m -	٥-	9.5 8.5	00	86	- 8	33.33 50.00	- 0			90
(2)Mining (2)Construction	~ ⊊	104	e-	300	2	15.19	, es	3.80	, <u></u>	1.27	· 60	11.39
(4) Food processing	300		• —	2.08	6	12.50	-	2.08		2.08	∞ -	16.67
(5) Textiles	92	23	9	8	₩.	21.74	۰.	6. 6.	 6	4.35		4.35
(6) Pulp and paper	61	œ.		s.56	⊶ <		C	٠. د. د. د.	7 -	11.11	C	, e
(7)Printing and publishing	س ق	m 0	-	 22	> ¬	96	> c~	12.07	- 62	3.65	~	
(9)0ile fate and paints	2 -	- C	۰.	20,	٠	9.09		9.09	0	0.00		9.09
(10) Pharmaceuticals	: 88	80	0	0.0	0	9.6	ယ ဇ	15.79	~ -	2.5e	es u	7.83
(11)Other chemicals	<u>ج</u>	34	~.	بر چې د	m c	2 C	N 4	3.68 23.53	- -	* 00 * 00 * 15	n c	
(12)Petroleum and coal products	× •	75	⊸ -	, v	>-	25.5	.	5.56		5.56	~	
(i s/riastic products (i 4)Rubber products	9 49	9 49	→ •	38	•0	0.0		16.67	0	0.0	<u></u>	16.67
	22	32	•	0.0	-	21.88		9. 13.	«	3.13	vo -	15.63
(16) Iron and steel	98	36	0	8.6	~ c	19.64	-	96	-> <	96	- ~	2. (8 16. 67
(] /)Nonferrous metals		25	>-	3.5	4 V	73.73	» —	4.55	•	00.0	. 0	9.0
(1 0) Martal products	33	77	-		, ~	5.56	••	0.00	_	1.64	φ	9.84
(2.0)Flectrical machinery and anniances	7 7	4 60	• 64	2.44	• 🛶	88.	•	3.66	0	0.00	22	18.29
(2 1) Communications, electronics, and	38	39	•	9.0	~	5.13	-	2.56	0	0.00	12	30.77
electrical measuring instruments	,	;	•		•		-		7	o o	v	-
(2 2) Automobiles	~ 0	.	> <	•	.	000	-	 	~ ~	1	, =	18
(2 3)Uther transport machinery	27	200	>	86	~		4 673	13.04		0.00		4.35
(2.5)Other industries	<u>:</u>	2	-	7.1	~	14.29		7.14	0	8.6	~	14.29
(26) Transportation, communications, and	92	52	•	0.0	~	8 8		8.	0	0.0	2	8.0
public utilities (21)Other types of industries	11	11	0	0.00	0	0.00	0	0.00	~	11.76		5.88
By arala of capital	Comparis	Comparison of R&O strength with that of U.S. and Europe, now	rength wi	th that of	U.S. an	d Europe, n	3					
חל פרפוב כן הפלורפו							;					
	No. of firms surveyed	Frequency (total value)	Europ Japan	Europe)U.S.) Japan	Japa Euro	Japan)U.S.= Europe	U.S.) Ja Europe	U.S.>Japan≕ Europe	Europ U.S.	Europe>Japan≕ U.S.	Japa Euro	Japan=U.S. > Europe
Firms responding Frequency (total value)/Lateral percentage	831	804 804.00	91	1.99	22	9.20	99	5.72	233	2.86	88	11.19
	906	900	Œ	2,00	32	10.67	7	4.67	-	2.33	25	8.33
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion	7203 7203 7203	0 - 5 0 - 5 0 - 6 0 - 6	460	2000	~~~ ~~~~		252-	6.22 7.30 4.76 2.78	ဖင္သဝဓ		o o	9.87 13.30 19.05
(5) More than ¥100 billion	n n	90	>	>	4	<u>.</u>	•) : :	ı	! !)

Comparison of R&D strength with that of U.S. and Europe, now

By type of industry	No. of firms surveyed	Frequency (total value)	Japan U.S.	Japan=Europe) U. S.	U.S.= Japan	U. S. =Europe) Japan	Japa	Japan=U.S.= Europe	Don.	Don't know
Firms responding Frequency (total value)/Lateral percent	831 1 831	804	88 85 85	4.35	69	6.03	127	15.80	77	5.4
(1)Agriculture, forestry, and fisher		•	•	9	•		٠		; •	•
		~	•	300	> Φ		⊣ 0	23. 23.	> c	56
(3) Construction	27 co	19	_	1.27	· ~			16.46	=	2
(4) rood processing (5) Textiles	50 26	~ c		2.08	5		0.	20.83	œ ·	9.9
(6) Pulp and paper	5	7 E	-0	0.00	> ~		• ~	17.39	∾ ⊂	8.5
(7)Printing and publishing	က္	ا ا	0	0.00	0		-	33.33	•	50
(9)Oils. fats. and paints	20	»	p	1.72 0.00	Ξ-		vs «	8.62	~	3.
(10) Pharmaceuticals	: œ	. es	•	0.0	- 21	26.32	~	10.53	-	0.00 2.63
<pre>\1 1/Uther chemicals (1 2)Petroleum and coal products</pre>	£ 60 60 60 60 60 60 60 60 60 60 60 60 60 6	34	0 c	96	 -		φ.	17.65	0	0
(13) Plastic products	, , ,	81	•	; ;	- 62			3.88 22.22	-	0.0
(1 4)Kubber products (1 5)Ceramics	9 (2	တ္ရ	~ ~	33.33	٥.			16.67		0.0
(16) Iron and steel	36	36	40	0.00	~ €		~ v	12.50	6 v	50
(17)Nonferrous metals (18)Note: accelerate	8	30	~~	6.67	0		ω	20.00		3.33
	79	22 61	~ ~	11 48	o ¬		c n o	40.91	 (4.55
l machinery		25	- es	3.66	•0		ភ		* ~	4.92
1/Communications, elec	33	33	0	0.00			~			2.56
(2.2) Automobiles	47	(5	ĸ	1.1	•	8	٠.	-	-	0
(23)Other transport machinery			~	11.11	. — .	5.56	-	, 47		5.56
(2.5)Other industries	7	7	.	, c	-	9.5		~	~	8.70
(26) Transportation, communications, an	2	22	, 04	00	-0	0.0	 00	32.00	> ~	12.00
public utilities (2 7)Other types of industries	11	17	•	0.00		5.88	4	35.29	0	0.00
	Comparison	of R&D	strength with that	th that of	U.S. and	d Europe, now	30			
By scale of capital	No. of firms surveyed	Frequency (total value)	Japan= U. S.	Japan=Europe) U.S.	U.S.=Europe Japan	urope)	Japan=U.S.= Europe	=U.S.=	Don't know	know
Firms responding Frequency (total value)/Lateral percent	831 831	804 804.00	33	4.35	67	6.09	127	15.80	3 3	5.47
(1)¥1 to 5 billion (2)¥5 to 10 billion	308 199	300 193		6.00	92	5.33	48 26	16.00	27	9.00
(3) #10 to 50 billion (4) #50 to 100 billion (5) More than #100 billion	39.20	233 36 36	~ N O	3.00 6.00	6 2 O	8.15 4.76 0.00	86	16.74 16.67 19.44	N 64	2.15

Comparison of R&D strength with that of U.S. and Europe, after 5 years

By type of industry	No. of firms surveyed	Frequency (total value)	Japan>U.S.> Europe	an>U.S.> Europe	Japan>Europe> U.S.	urope)	U.S.>Japan> Europe	apan)	U.S.>Europe> Japan	rope>	Europe)Japan U.S.	Japan
Firms responding Frequency (total value)/Lateral percentage	831 831	782 782.00	77	18.41	85 85 85	11.76	តត	3.96	92	3.32	ww	0.64
										•		
(1)Agriculture, forestry, and fisheries	Ю	€7.	96	88	00	88		33.33	-	9.50 5.00 5.00	-	96
(2) Construction	→ 6	÷ 0	-	3.5	> ~	35	۰.	25.62	-	23.00	- e	
(4) Food processing	200	2 42	9	13.04	, 	2.17	. —	2.12	. 0		•	2.17
(5) Textiles	2 2	21	, es	14.29	r)	23.81	-	4.76	o :	0.0	0	0.0
(6) Pulp and paper	61	81	m ·	16.67		5.56	~	= 5	0	8.6	0	88
(//Frinting and publishing (8)Sunthetic chemicals	۳ <u>د</u>	w	-	5.00	 - 6*	33.33 5.23	- v	3.00	> ¬	7.02	> ~	3.51
(9)0ils, fats, and paints	2 I	31	-	90.0	-	9.03		9.03	-	9.09	0	0.0
(10)Pharmaceuticals	. es	31		2.70	(2.70	٥.	0.0	~ 0	18.92	0	9.6
(1) Detections and cost and cost	က က	34	 c	20.59	N C	٠. چ چ		7 % 5. %	~	23.88	-	
(13)Plastic products	× 00	- 82	~	11.11	9 64	11.11	- 72	11.11	•	0.0	•	98
(14)Rubber products	و م	9		16.67	¢	16.67	٥.	9.6	0	9.6	o -	9:
(1 0) Leramics (1 6) Iron and atem	22.5	27	۰ ح	18.75	~ <u>~</u>	35.28			> e			200
(17)Nonferrous metals	9 8	5 c	• •	24.14	3 64	9.30	. ~2	6.90	•	3.45	0	0.0
(18) Wetal products	23	22	~	9.03	~ !	9.09	۰,	2; 0.	٥.	e: :-	0	6.6 6.6
(1 9)Machinery (2 0)Electrical machiness and analisance	3	00	25	16.67	2 :	25.00	~~	 	→ ←	70.1	-	96
(2 1)Communications, electronics, and	2 83	3 t-	12	40.54	3-	2.70	, 6	2. €	••	0.00		9
electrical measuring instruments		7	9	32 26	2	30.73	•	9	•	00.00		2.33
(2.3)Other transport machinery	- œ	200	•	22.22	. ~	16.67	•	0	~~	=======================================	0	0.0
	7	27	- - 1	33.33	ᡇ.	19.05		4 .76	-	9.6	96	86
(25)Other industries	- 4	7 %	n	32.7		-0-	>~	38	>	38	•	38
	•		. ,	; ;	, ,		•	•	•			
(2 7)Other types of industries	11	17	∾.	11.76	m	17.63	-	0.0	-	 88	-	3.0
By scale of capital	Compariso	Comparison of R&O strength with that of U.S. and Europe, after 5 years	ength wi	th that of	U.S. and	Europe, a	fter 5 ye	ars				
	No. of	Frequency	nedel	Japan > U.S. >	Japan>Europe>	urope)	U.S. > Japan>	Japan)	U.S. \Eurone\	rone)	Firmone	neuel.
	r irms surveyed	(total value)	3	Europe	U.S.		Europe	• <i>:</i>	Japan	ų	U.S.	
Firms responding Frequency (total value)/Lateral percentage	831 831	782 782.00	33	18.41	92 92	11.76	333	3.96	26 26	3.32	ss ss	9.64
	808	290	0	17.24	. 17	14.14	01	3.45	s	1.72	62	1.03
(1)*1 to 5 billion (2)*5 to 10 billion (3)*10 to 50 billion (4)*50 to 100 billion (5)************************************	2 2 2 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	230 230 360 360 360	225	15.05 17.50 22.22		13.44 7.83 13.89	7927	5.45 2.00 3.00 3.00	۳=	3.23 7.50 7.50	0000	0.00
COVERNIE THE STATE OF TAXABLE												

Comparison of R&O strength with that of U.S. and Europe, after 5 years

By type of industry	No. of firms surveyed	Frequency (total value)	Europ Japan	Europe>U.S.> Japan	Japi Euro	Japan>U.S.= Europe	U.S.)Ja Europe	U.S.>Japan= Europe	Europ U.S.	Europe)Japan≕ U.S.	Jap. Eur	Japan=U.S.) Europe
Firms responding Frequency (total value)/Lateral percentage	831 831	782 782.00·	==	1.41	112	14.32	90 80 	2.30	தை	1.15	55	8.95
(1) Apriculture, forestry, and fisheries	u	e	•	6	c	6	•		•	6	•	•
2)Mining	n ~	~ ~	> C	96	>	25.00	- C	,,,	>	900	> <	36
3)Construction	. 28	75	-	3	22	20.33	• =	00.0	> ~	2.57	.	200
4)Food processing	20	9	. 0	88	00	17.39	• •	0.00	۰	2.17	s vs	10.87
5) Textiles	26	21	0	0.00	. 🛶	19.05	•	0.00	.0	0.00		0.00
6)Pulp and paper	19	81	~	11.11	2	11.11	0	0.00	0	0.00	0	0.00
(7)Printing and publishing	က	က	0	0.00	0	0.00	0	0.00		33.33	0	0.00
8)Synthetic chemicals	29	21		1.75	m	5.26	~	7.02	~	3.51	~	12.28
9)Dils, fats, and paints		1	0	0.0	0	0.0	0	0.00	0	0.00	m	27.27
U)Pharmaceuticals	80 c	37	٥.	0.0	m.	8.11	(2.10	0	0.00	•	18.92
1/Uther chemicals	ر د د	34	(2.94	~ ·	11.76	~	 	0	0.00	.	14.71
7) Petroleum and coal products	8	11	0	0.00	0	0.00	~	11.76	0	0.00		5.88
V Plastic products	æ (æ ((5.56	∾ .	11:11	0	9.60	 ,	5.56	~	11.11
/ Kubber products	و م	۽ م	5	9.00	 (16.67	٥.	0.00	-	0.00	<u>-</u>	000
S/ceramics 6/1	25	35	> 0	00.00	20 (25.00	 •	3.13	5	0.00	— .	3.13
7) Nf	98	300	٥.	0.00	۰ م	17.65	-	0.00	0	0.00	-	2.94
/Nonrefrous metals	200	5.2°	۰ د		~ ·	10.34	~ ·	10.34	> 0	8.6	- - (3.45
a) Machiner:	57	77			n c	57.73	> -		>-	3:	~ •	50.5
/Machinery)Flactoics ==chines: and analiance	•	26		26	ספ	20.0		70.	- - c	20.0	~ c	20.00
1) Communications, electronics, and	* O	2.5	-	22.7	o ~	20.01	- c	50.0	-	30	p -	C7 - 11
electrical measuring instruments	}	i	•		•		•	3	•	:		3
2)Automobiles	L †	t 3	0	0.00	-	16.28	0	0.00	0	0.00	"	6.98
3)Other transport machinery	2	æ:	0	9.0	 (5.56	۰.	0.00	0	0.00	_	5.56
2 4)Precision machinery)	12:	-	800	~ 6	3.52	· ·	9.70	-	0.00	~ .	9.52
(2 5)Uther industries			> <	96	· ·	15.00	> <	95	> c	36	- - •	*. I &
Officensportation, communications, and	7	3	>	÷	•	70.0	>	9	>	9.0	7	8.00
(27)Other types of industries	11	11		5.88	~	11.76		5.88	-	5.88		5.88
By scale of capital	Comparison	on of R&D strength with that of	ength wi	th that o	U.S.	and Europe, after 5 years	after 5	years				
	No. of	Frequency	Fileson	Furgon 11 C 1	, del	= 2 0	2.1	-Japan=	Fire	-acacl 10) H-1
	firms surveyed	(total value)	Japan		Eur	Europe	Euro	Europe	U.S.	U.S.	Europe	Japan-u. s. y Europe
R responding		103	=		:		0		ć		Ş	
Frequency (total value)/Lateral percentage	831	782.00		1.41	112	14.32	<u> </u>	2.30	ח כח	1.15	22	8.95
)¥1 to 5 billion	308	290	'n	1.72	=	14.14	S	1.72	2	0.69	52	8.62
(2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion	240 45	186 230 40	n - 0	1.08 0.78	23 11	14.52 12.17 27.50	vo to ⊶	2.69 2.61 2.50	000	1.08 2.17 0.00		9.14 7.39 7.50
(5) Wore than ¥100 billion	39	36	•	0.00	S	13.89	-	2.78	0	0.00	00	22.22

Comparison of R&D strength with that of U.S. and Europe, after 5 years

By type of industry	No. of firms surveyed	Frequency (total value)	Japan= U.S.	Japan=Europe) U.S.	U.S.=I Japan	U.S.=Europe} Japan	Japan=U.S.= Europe	e.U.S.=	Don't	Don't know
Firms responding Frequency (total value)/Lateral percent	831 831	782 782.00	33	5.63	88 88 78 88	3.58	131	16.75	61	7.80
oducts oducts and and applian ronics, and	88000 HERBER HOUSE 88000 HERBER HOUSE 8444 HOUSE HOUSE 844 HOUSE 844 HOUSE 844 HOUSE 844 HOUSE 844 HOUSE 844 HOUSE 844 HOUSE 844 HOUSE 845 HOUSE 845 HOUSE 846 HOUSE 8	6481 818811 8888888888888888888888888888	00-887-0-H	00-14000-100000000000000000000000000000	00-1000-4-400000-000	00.000000000000000000000000000000000000		120 00 00 00 00 00 00 00 00 00 00 00 00 0		33.30000000000000000000000000000000000
electrical measuring instruments (2.2) Automobiles (2.3) Other transport machinery (2.5) Other industries (2.5) Other industries (2.5) Transportation, communications, are public utilities		41010 88-48	7010 (9.30 11.11 4.76 7.14	NO	40404 000000	N4-WO 1	48454	-	mur-00
(27)Other types of industries	17 Comparison	17 of R&D	0 0.00 strength with that	0.00 th that of	U.S. and	0.00 d Europe,	5 after 5	29.41 years	•	0.0
By scale of capital	No. of firms surveyed	Frequency (total value)	Japan=I U.S.	Japan=Europe) U.S.	U.S.=E Japan	U.S.=Europe> Japan	Japan=U.: Europe	U. S. =	Don't	Don't know
Firms responding Frequency (total value)/Lateral percent	831 831	782 782.00	7 7	5.63	2 88 2 83	3.58	131	16.75	61	7.80
(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion (4) #50 to 100 billion (5) More than #100 billion	308 240 39 39	290 230 36	12231	5.52 6.99 5.22 5.00 7.00 7.00	H-010	3.79 2.50 0.00	\$250 \$4.00 \$4.00	17.24 14.52 20.00 10.00 11.11	2 2 2 2 2 2 2 2 2 2 3 2 3 3 3 3 3 3 3 3	8.8.97 8.06 5.52 5.50 5.50

Question 2	Future int	international	situation	in connec	connection with	SET	÷					
By type of industry	o.	Frequency	Tense internation al situation in connection with S&I (technology disputes, etc.)	Ė	Tense in	ternation-	Programade tion	Progress will be made in interna- tional coopera- tion, and tense	No progr internat cooperat	No progress in international cooperation, and		
Firm responding		(total ' value) 823	will bec		continue	continue partly & intermittently	relatio	s will	al relat	ions will	Other.	
Frequency (total value)/Lateral percent	sent 831	823.00	136	16.52	212 212	62.21	တ တ တ တ	12.03	77.	2.92	25 52	6.32
(1) Agriculture, forestry, and fisher		~		25.00	er	75.00	•	6	5			
(2)Mining (3)Construction		8	0	0.0	•	100.00	> 0 ;	0.0		0.0		6. 6
(4) Food processing	200	200	ເຄັ	6.00	7 6	53.66 60.00	ლ ლ	15.85 16.00	04 CO	5.00	. so ce	9.76
(6) Pulp and paper	13	9 61 13 62	ი 🕶	19.23 5.26	2 -	57.69	~ ~	7.69		11.54		
(1) Frinting and publishing (8) Synthetic chemicals	۳ کو کو	ຕິ	00	0.00	25	66.67	· :	33.33		0.00	-	0.00
(9) Oils, fats, and paints		308) (V t	20.00		40.00	- 2	11.29 20.00		3.23 20.00		1.61
(11) Other chemicals	300	320	~ ~	11.43	52 52	63.16	vs v:	13.16		2.63		2.63
(12) Petroleum and coal products (13) Plastic products	8 80	- so	നന	17.65	œ <u>c</u>	47.06)	. 88		86.		23.53
(14)Rubber products	9 (တ္ရ	0	0.0	100	33.		16.67		0.0		11.11
(16) Iron and steel	38	9e	7 89	6.23 8.33	58 20 20	50.00 80.56	="	34.38		0.00		9.38
<pre>(1 0) Nonferrous metals (1 8) Metal products</pre>	888	30 23 23	اد د ده	16.67	67.	63.33	· en e	10.00		38.		6.67
(19)Machinery (20)Electrical machinery and applia		51		14.75	3 5	72.13	4 67 (4.92		3.28		8.70 4.92
(21) Communications, electronics, and		38	7	35.90	22	64.10	» 0	9.64 0.00		2.41		3.61
(2.2)Automobiles			10	نے 🕟	23	70 21	,					
(23)Other transport machinery (2.4)Precision machinery	18	18 24	~ (22.22	32.	55.55	-~	3-:	> ==	5.56 5.56	o =	0.00 5.56
(25)Other industries			> •	:-:	. 01		N 64	14.29	c	٦.	6	
(2 0) Iransportation, communications, public utilities	æ		eo.	12.00	10	40.00	1	9	0			
(27)Other types of industries	11	11	7	23.53	7	41.18	7	11.76	-	5.88	m	17.65
	Future inter	international si	ituation i	in connection	on with	S&T						
		- 60	ense inte il situati connection	ernation- ion in with			Progress made in i		No progre	88 in		
By scale of capital	No. firms surveyed	Frequency d	al (techrisportes,	S&T (technology disputes, etc.) will become more	Tense international relations will continue partly &	ernation- ons will bartly &	tion, and tense international relations will		cooperation, and tense internation- al relations will	on, and ernation— ons will	4+0	y - 4
Firms responding Frequency (total value)/Lateral percent 83		823 823.00	136 136	16.52	512 512	62.21	66 66		81minish 24 24	2 92	52	6
(1) W1 4- E Lillian	•	. 506	ć	•					;	<u>:</u>	•	
(2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	00 4 4 60 00 0 70 00	2308 2308 3955 3955	າຕທ ກ ຕວສ ⊣	12.73 19.19 17.78 2.56	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60.65 60.61 63.14 64.44 74.36	242 258 258 258 258 258 258 258 258 258 25	13.77 14.14 8.05 11.11	52 52 52 52 53 53 53 53 53 53 54 54 54 54 54 54 54 54 54 54 54 54 54	2.533 2.533 0.00 0.00 0.00	4357	8.85 3.54 6.67 0.26

How firms will cope if tense international relations do not disappear

By type of industry	Number firms surveyed	Frequency (total value)	Technology transfer	logy	R&D CO	R&O cooperation	Establ. R&D str	Establishing RLD strong- points overseas	Endeavoring to gain understand ing of society in the area	Endeavoring to gain understand- ing of society in the area	We will not deal with it in any active way	not th it active
Firms responding Frequency (total value)/Lateral percent	831	647	178	27.51	231	35.70	16	11.75	- 12 13 13	67.9	100 100 15.46	15.46
(1) Agriculture, forestry, and fisher	10	.	00	9.6	~	50.00	c	25.00	00	0.00		25.00
(3)Construction		- 80 - 80		22.41	23°	39.66	~ ~	3.45	~ ~	3.45	16	27.59
(4)Food processing	200	888	40	12.12	7 °	42.42	-	12.12	~ e	3.03	60 (2	24. 24 30. 00
(6)Pulp and paper		25	> ~	16.67	~	33.33	•	0.0	· ~	25.00	· es	25.00
(7)Printing and publishing		2	-	20.00		50.00	0	0.00	0	9:	01	9.9
(8) Synthetic chemicals		25	77	23.08	23	44.23	~ ·	5.77	m c	 		13.45
(%)Olls, rats, and paints (10)Pharmaceuticals		3.°	⊸ જ	9.00	7 82	58.08	E	22.58	. .	88.	- 72	6.65
(11)Other chemicals		53	တ	31.03	15	41.38	en (10.34	2	6.30	က	10.34
(1 2)Petroleum and coal products		=:	63 1	27.27	6 n	54.55	٥.	0.00	۰.	12.22	~ 6	18. 13.
(1 4) Flastic products (1 4) Rubber products		ر د د	ω -4	22.52	0	25.55	→ ⇔	00.0	.	20.00	40	9.6
(15)Ceramics		• <u>•</u>	· -	38.89	S	27.78	~~	11.11	0	0.0	က	16.67
(16) Iron and steel	36	32	=	34.39	2	31.25	⊶ (3.13	es .	9.38	ro .	15.63
(17)Nonferrous metals	m (72.	6	22.00	∞ ~	33.33	~ c		-	. o. o.	→ ~	10.01
(19)Machinery	. ~ •	23	۵ ۽	25.44	• <u>"</u>	27.77		18.52		7.7	.	
(2 0) Electrical machinery and appliance	D 00	• o	53	33.33	92	23.19	91	23.19	·vɔ	7.25	00	11.59
(2 1) Communications, electronics, and	സ	39	13	33.33	12	30.77	r.	12.82	m	7.69	ص	15.38
electrical measuring instruments (9.9)Automobiles		77	5	99, 55	_	25.00	œ	20.45	,	60	۲.	11.36
(2.3)Other transport machinery	<u>~</u>	: =	ع:	42.86	. v	35.71	0	0.00	·	7.14	~	14.29
(2 4)Precision machinery	-~	202	, vs	25.00	-	35.00	w	25.00		5.00	~	10.00
(25)Other industries	Ξ	2	S	50.00	~	20.00	0	0.00	~	10.00	~	20.00
(2 6) Transportation, communications, ar	. 26	13	0	0.00	9	76.92	0	0.00		7.69		7. 69
(27)Other types of industries	11	11	ĸ	45.45	~	36.36		9.09	0	0.00	-	9.03
How	_	firms will cope if	tense in	ternationa	ıl relati	tense international relations do not disappear	disappea					

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By scale of capital	Number firms surveyed	Frequency (total value)	Technology transfer	logy er	R&D Coo	cooperation	Estab R&D s point	Establishing R&D strong- points overseas	Endeavoring to gain understand- ing of society in the area		We will not deal with it in any active way	د د د
Firms responding Frequency (total value)/Lateral percen	831 ercent 831	647 647.00	178 178	27.51	231	35.70	3. 3.	11.75	42 42 6.49		00 12	15.46
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5) Wore than ¥100 billion	2 - 2 2 - 2 3 - 3 3 - 3 3 3 - 3 3 -	224 157 199 30	0 0 0 5 0 4 0 4	29.91 32.29 32.16 21.62 13.33	0.480 = 80 8 = 80 = 80	35.71 34.39 34.17 29.73 60.00	95.55	2.68 12.10 15.58 35.14 23.33	18 8.04 10 7.64 10 5.03 1 3.33	77000	21 19 20 21 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20.54 19.75 10.55 5.41

0ther 33 Later (after 3-5 They will not become years) we think our competitors for they will become a long time (more our competitors than 7-8 years) 225.00 33.00.86 315.38 315.38 315.38 315.31 3111.65 31 Technological strength of Asian NIEs in same categories of industry 271 50.00 53.85 53.85 53.85 54.33 54.35 52.96 66.67 They are now our competitors 20.00 25.00 25.00 25.00 10.00 0.00 0.00 0.00 11.29 25.71 11.29 11.20 11. Frequency (total value) 820 820.00 Numbers firms surveyed 63362 63363 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 6366 6336 636 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 6336 636 636 636 636 636 636 636 636 636 636 636 636 636 636 636 636 636 831 Firms responding Frequency (total value)/Lateral percent (1 9) Machinery (2 0) Electrical machinery and appliance (2 1) Communications, electronics, and electrical measuring instruments (1)Agriculture, forestry, and fisher (12) Petroleum and coal products (13) Plastic products (14) Rubber products (15) Ceramics (16) Iron and steel (17) Nonferrous metals (18) Metal products (6)Pulp and paper (7)Printing and publishing (8)Synthetic chemicals (9)0ils, fats, and paints (10)Pharmaceuticals (11)Other chemicals 4)Food processing 5)Textiles By type of industry (2)Mining (3)Construction **Question 3**

34.78 35.29 43.48 38.46

6.52 5.88 4.35 0.00

ĕ

(2 3) Other transport machinery (2 4) Precision machinery (2 5) Other industries (2 6) Transportation, communications, public utilities

(2 7)Other types of industries

	Technologic	al strength c	of Asian	NIEs in sar	me categ	pories of in	ndustry			
By scale of capital	Numbers firms surveyed	Numbers Frequency years) we think our competitors for firms (total They are now they will become a long time (more surveyed value) our competitors our competitors than 7-8 years)	They our c	are now ompetitors	Later years] they w	(after 3-5) we think will become mapetitors	They will our con a long than	.ll not becompetitors for time (more 8 years)	۰ و ر	ther
Firms responding Frequency (total value)/Lateral percent	831 ht 831	820 820.00	9 9 52	11.59	423	51.59	271 271	33.05	31	3.78
(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion	308 199	303 197	2 52 2 52 2 52 2 53	9.57	161	53.14	100 65	33.00 32.99	544	2.03
	 	3 45		17.78	222	48.89 39.47	222	28.89 34.21	o 60 60	15.79

State of ownership of overseas R&D strongpoints IV. State of Globalization of Private Enterprises' R&O Activities Ovestion 1.

By type of industry	Number firms surveved	Frequency (total		Have	9	Do not have
Firms responding Frequency (total value)/Lateral percent	831 831	826 826.00	111	14.16	709 709	85.84
(1)Agriculture, forestry, and fisher	1 50 =	-	00	9.0	~~	100.00
(3)Construction	* 2	• 62 • 60	0	900	85	100.00
(4) Food processing	• 6	S	ω.	12.00	=	88.00
(S)Textiles	26	5 2	-	3.85	25	96.15
(6)Pulp and paper	19	19	~	10.53	11	89.47
(7)Printing and publishing	m	m		33.33	~	66.67
(8)Synthetic chemicals	29	62	S)	8.08	27	91.94
(9) Uils, fats, and paints	11	11	es (27.27	50	72.73
(10)Pharmaceuticals	œ :	37	<u>ج</u>	35.14	7 6	94.00 00.00
Other chemicals	<u>بر</u>	33	۰ م	¥1.71	S 2 -	99.79
(12)Petroleum and coal products	æ :	× •	~ €	, o	- 0	***
(1 4) Plastic products			>-	. 6.00		30.00
(1.5) Teramics	200		- e-	200	53	90.63
(16) Iron and steel			~	5.56	34	94.44
(17)Nonferrous metals	96	50.0	. es	10.34	5 6	89.66
8	23	23	2	8.70	77	91.30
(19) Machinery	79	79	2	20.31	51	79.69
6		***	6	22.62	65	•
=		30	00	20.51	33	79.49
electrical measuring instruments						
2)A	11	46	12	32.61	33	67.39
	18	82	~	11.11	9	80
(2 4)Precision machinery	24	24	∞	33.33	9	66.67
(25)Other industries	7	13	~	15.38	=:	84.62
	3 6	5 6	0	0.00	56	100.00
public utilities (2 1)Other types of industries	11	11	-	5.88	16	94.12
State	State of ownership of		seas R&	overseas R&D strongpoints	ints	
By scale of capital	Number firms surveyed	Frequency (total value)	_	Have	å	Do not have
Firms responding Frequency (total value)/Lateral percent	831	826 826.00	117	14.16	709 709	85.84

14 25 17 17 17 17

307 237 395 395

308 199 45 39 39

(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion

When overseas R&O strongpoints were set up--United States

Ovestion 2

By type of industry	Number firms	Frequency (total	Befo	Before 1979	19.	1978-1979	198(1980-1084	13	1985-1991	Plan bi	Plan to set up in the
Firms responding Frequency (total value)/Lateral percent			mm	2.83	13	12.26	ដដ	12.26	75	70.75	ruture 2 2	ة ي
(1)Agriculture, forestry, and fisher		•	•	;	•						ı	:
(2) Mining		> c	> <	300	>	9.00	0	0.00	0	0.00	0	0.00
(3)Construction	• 60	>	> <	900	>	9.0	-	9.00	0	0.00	0	0.0
(4)Food processing	3 6	.	>	9	> -	9.00	> c	0.00	٥.	9.60	۰ د	0.00
(5)Textiles	88	3	,		- c	20.00	> 0	9.0	⊶.	20.00	.	0.00
(6)Pulp and paper	3 5	- ~	> <		> c	900	> C	5.0	c	200.00	- •	0.0
(7)Printing and publishing	• ~	• ~	> c	36	> <		> c	3	~ c	100.60	٥ (8
(8)Synthetic chemicals	95	s LC	• =		-		-	9	> u	9 6	> c	9.0
(9) Uils, fats, and paints	=	· en	. 0	00.0		33.33	, c	36		66.67	>	
(10)Pharmaceuticals	38	13	0	0.0		7.69	· ~	15.38	4 07	69.23	- c	7.00
(11)Uther chemicals	35	ص	0	0.00	0	0.00	0	0.00	6	100.00	• 0	
(1 %)Plantic and coal products	8	omd (0	0.00	0	0.00	0	0.00		100.00		0.00
(1 4) Pubber products	8 2 °	٥.	o .	0.00	0	0.00	0	6	•	0.00	0	0.00
(15)Ceramics	٠,	 c	> <	38	90	0.00		100.00	•	00.00	0	0.00
(16) Iron and steel	3 K	4	> c	96	> 0	9.0	-	00.0	~ .	100.00	0	0.0
(17)Nonferrous metals	30		> C		> <	36	> <	36	- , -	00.00	-	6.00
(18)Metal products		r	>	900	> <	96	> <	36	•	20.00	> <	9.0
(19)Machinery			• =		^	~ ~ ~	۰ د	. a	- u	100.00 54.55	> -	900
(20) Electrical machinery and appliance	ă	5	~ ~	10, 53	•	2	3 67		- =	20.74	- c	, ,
(2 1)Communications, electronics, and		ys	0		0	00.0	0	0.00		100.00	· c	9
electrical measuring instruments))	,		•		•	•
(2 Z)Hutomobiles	-	15	_	•	~		-		~	46.67	0	0.00
(4 J)Dracinion machinery	∞	~	0	•	~		0		0	0.00	0	0.0
(2.5)Other industries	7 2	00 e	0	8.6	0	0.00	—	12.50	~ (87.50	0	0.00
(2 6) Transportation, communications	ň	7 C		•	= 0		-		~ <	100.00	-	0.6
public utilities	5	•	>	•	>		>		>	9.0	>	9.0
(2 1)Other types of industries	11		0	0.00	0	0.00	0	0.00		100.00	•	0.00
_	When overseas	R&D	ints were	strongpoints were set upUnited States	United S	tates						
By scale of capital	Necher	Freditency									5	
	ب ب	(total	Befor	Before 1979	197	1970-1979	1986	1980-1084	198	1985-1991	up in the	the the
Firms responding	w		62				13		7.5		- 6	
Frequency (total value)/Lateral per	œ	106.00	· 673	2.83	13	12.26	523	12.26	55	70.75	• • •	1.89
(1) ¥1 to 5 billion	308	12		8.33	-	8.33	0	0.00	10	83.33	•	00
(2)¥5 to 10 billion	199	22		4.55	~ ·	æ.	es.	13.64	=	63.64	• •	.0
(4) ¥50 to 100 billion	45	20	•	38	- ~	90.0	ი ო	15.00	3.5	10.00		2.50
(5) More than ¥100 billion	89	12	-	8.33	~	16.67	~	16.67	-	58.33.	•0	0.00

When overseas R&D strongpoints were set up--Western Europe

By type of industry	Number firms	Frequency (total	Befor	Before 1979	197	1978-1979	198	1989-1984	31	1985-1991	P. P.	Plan to set up in the
Firms responding Frequency (total value)/Lateral percent	surveyed 831 1 831	value) 71 71.00	~~	2.82		8.45	ww	7.04	44	60.56	15 ut	uture 21.13
(1)Agriculture, forestry, and fisher (2)Mining	no é		000	000	000	888			000	888	000	888
(4) Fount of the control of the cont	205	 	>	888	>	388	9 00		> N C	66.67	-	33.33
(6) Pulp and paper (7) Printing and publishing	9 E E	•	,,,,	888	•••	666	000	888	0	00.00	•••	888
(8) Synthetic Chemicals (9) Oils, fats, and paints (10) Pharmaceuticals	3218	9	000	0000	60 m.	000		0.00 0.00 0.00 0.00	0-1-0	100.00 20.00 20.00	00-0	9999
(11) Dither Chemicals (12) Petroleum and coal products (13) Plastic products	288	₹00		388	~00	0.00		0.00	NO0	0.00		888
(14)Rubber products (15)Ceramics (16)Iron and steel	32 32 36 36	o		888	999	668	000	 888	o	0.00 100.00 100.00	000	888
(17)Nonferrous metals (18)Metal products (19)Machinery		· ~ ~ ~		888	000	888	00 -	0.00 0.00 12.50	to	50		50.00 50.00 12.50
(2 0)Electrical machinery and appliance (2 1)Communications, electronics, and alectrical massimina instruments		25 25	-0	0.00	-0	6.67	-0	6.67 0.00	- m	46.67 60.00	5 62	33.33
338	18	=		600		9.09	000	00.00	& O-	0.00	-0	90.0
(25)Other industries (26)Transportation, communications, and	26	0	.00		•00	0.0		000		0.00	100	888
public utilities (2 1)Other types of industries		0	0	0.00	0 1	0.00	•	0.00	0	0.00	0	0.00
when By scale of capital	n overseas Number firms	Keu strongpoints were set upmestern turope Frequency Before 1979 1970-1979	ints were Befor	were set up Before 1979	1978	iin curope 1978–1979	1986	1980-1084	61	1985-1991	Plan to	Plan to set up in the
Firms responding Frequency (total value)/Lateral percent	surveyed 831 831	value) 71 71.00	ักก	2.82	 	8. (5	n n	7.04	25	60.56	future 15 15	re 21.13
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	2130 244 3450 250	2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		80000 80000	00110	0.00 0.00 7.14 0.00	0~~~	0.00	-0750	33.33 50.00 71.43 82.43	-4F0m	33.33 26.67 25.00 14.29 9.09

When overseas R&D strongpoints were set up--Asian NIEs

Plan to set up in the	5 18.52	0.00								0.00											5		1 100.00	ö	ö	0 0 0		Plan to eat	up in the	S state	ė	0 0.00	
1985-1991	10.74	0.00	0.00	00.0	000	3.0			20.00	0.00	0.00	0.00	3.0	36	900	0.00	0.00	60.00	77.77	0.00	20 00	100.00	0.00	0.00	0.00	0.00			1985-1991	10 47		0.00 28.57 70.00	0.00
	==	0	0	> 0	> <	> <	> <	>	-	0	0	Ö	> 0	> <	, c	•	0	'n	~	0	-	-	• 0	0	0	0					=	021	~ 0
1986-1684	11.11	0.00	0.00	000	20.00	900	36	9.6	00.0	0.00	0.00	0.00	36	9.0		0.00	0.00	0.00	22.22	0.00	6	900	00.0	0.00	0.00	0.00			1986-1684	:	11-11	0.00 14.29 10.00	33.33
-	ოო	0	> 0	٠ ,-	e	> <	> <	.	0	0	o .	0	> c	-	· c	0	0	0	~	•	•	-	•	0	0	0			ST .	m r	•	0	0 -4
1978-1979	22.22	0.00	0.0	9.00	20.00		36	86	50.00	100.00	0.00	0.00	20.00	9.0		0.00	100.00	20.00	0.0	0.00	c	96	99	0.00	0.00	0.00	NIEs		1978-1979	23 33	99.99	100.00 42.86 10.00	00.0
-	တ လ	0	>	-	- c	> <	> <	•	•	-	0	00	> -	- c	•	0	-	_	0	0	•	9 6	•	0	0	0	Asian		=	φ.	>	26-	00
Before 1979	7.41	9.0	96	36	36	3	96	86	0.00	0.00	100.00	9.6	36	9 6	00.0	0.00	0.00	20.00					0.0			0.00	ere set up		Before 1979	17.4		0.00 14.29 0.00	0.00
æ	~~	0	> <	> <	-	> <	, c	• •	0	0	(0	> <	> <	•	0	0		0	0	<	•	. 0	0	0	0	ints w		Be	~~	J	0-10	-0
Frequency (total value)	27 27.00	00	> <	> c	N C	> <	> <	.	. 2	·	 (= •	>-	- ∈		•		ß	σ,		•	.	1	0	0	0	R&D strongpoints were set upAsian NIEs	Frequency	(total	27	•	22-01	v es
Number firms surveved	831 1831			79) (0 0	<u>.</u>	2	=	38	ر د د	œ c	94	200	3 6	30	23					- «	72	=	~	11	n overseas	Number	firms	000	700	308 199 240	39.5
By type of industry	Firms responding Frequency (total value)/Lateral percent 8	(1) Mgriculture, Torestry, and Tisner (2) Mining	(3)Construction	(A) Food procession	(5) Textiles	(6) Pulo and paper	(7) Printing and publishing	(8) Synthetic chemicals	(9) Oils, fats, and paints	(10) Pharmaceuticals	(11)Other chemicals	(12)Petroleum and coal products	(1.4.) Pubber products	(15) Ceramics	(16) Iron and steel	(17)Nonferrous metals	(18)Metal products	(19) Machinery	(20) Electrical machinery and appliance	(Z)/Communications, electronics, and	2) 6	(2 3)Other transport machinery	(2 4) Precision machinery	(25)Other industries	(2 6) Transportation, communications, an	public Utilities (2.7)Other types of industries	When o	By scale of capital		Firms responding Francency (total value)/(atera)	ייקיייל ייטיפן אפוחניי בפינים לייטיקיי	(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion	(\$/ +30 to 100 Dillion (\$) More than ¥100 billion

Reasons for setting up R&D strongpoints overseas--United States

Question 3.	Reasons for	setting up R&D	D strong	strongpoints overseasUnited States	seasUn	ited States						
By type of industry	£ 4 6		To stre techno power tion s	To strengthen technological power of produc- tion strongpoints	R&D that copes with overseas needs, R&D for purpose of improving productions.	that copes overseas s, R&D for ose of im-	To search technolog (securing research mation)	o search for echnology seeds securing basic esearch infor- ation)	To promotresearch universit firms in countries	To promote joint research with universities and firms in other countries	To secure an use superb genius over- seas	re and erb over-
Firms responding Frequency (total value)/Lateral percent	831 rcent 831	105 277.00	9	38.10	. 61	15.24	8	45.71	21	25.71	33	31.43
(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Lextiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmaceuticals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (13) Plastic products (14) Rubber products (15) Ceramics (16) Iron and steel (17) Monferrous metals (18) Metal products (18) Metal products (19) Machinery (20) Electrical machinery and appliance (21) Communications, electronics, and electrical machinery and appliance (21) Communications, electronics, and captured and control machinery (20) Electrical machinery (20) Electr	isher 5 250 250 250 250 250 250 250 250 250 2		000111010040010101470	100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00	000000000000	00.00 00	00000-0-080000000	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	-94000000000	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	000-00000000	33.33.90 33.30 33.30
(2.2) Automobiles (2.3) Other transport machinery (2.4) Precision machinery (2.5) Other industries (2.6) Transportation, communications,	24 18 24 3, ar 26	,	00000	100.00 0.00 0.00 0.00	0.0820	100.00 100.00 0.00 0.00	0-12-0	33.33 50.00 50.00 0.00		6.67 0.00 25.00 0.00	%0 4%0	13.33 0.00 50.00 100.00
(2 1)Other types of industries	17	7	•	0.00	-	100.00		100.00	.	0.00	0	0.00
Reas By scale of capital Firms responding Frequency (total value)/Lateral percent	ons for Number firms Surveyed 831	Frequency (total value)		strongpoints overseas-United States R&D that copes Is strengthen with overseas technological needs, R&D for power of product purpose of imition strongpoints proving products 40 38.10 79 75.24	R&D that copes with overseas needs, R&D for purpose of improving product 79	-United States that copes overseas is, R&D for cose of imming products 75.24	トナー r E	To search for technology seeds (securing basic research infor- mation)	To promote joi research with universities a firms in other countries	nd nt	To secure and use superb genius overseas	re and erb over-
(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion (4) #50 to 100 billion (5) More than #100 billion	8 4 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	325 34 34 34 34	∞ v ∞ r-	56.67 27.27 28.95 53.85	94079	75.00 63.64 78.95 69.23	8-2-8	25.00 31.82 57.89 35.00 69.23	2 <u>4</u> 22	8.9 9.03 25.00 46	- 20 O A	8.33 26.32 45.00 30.77

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leasons

•	easons for s	Reasons for setting up R&O strongpoints) strongpoi	ints over	seasUn	overseasUnited States	•					
By type of industry	₹.C. 8	Frequency (total value)	To provide stimulus to e	e ta	We came to own R&D strongpoints through acquisi- tions of oversea firms	came to own strongpoints ough acquisi- ns of overseas	For affiliated firms to make inroads overse	iliated o make overseas	In order not to lag behind in the industrial	rder not to behind in industrial d	To make the name of our firm penetrate in order to facilitate future ordering.	e name m pene- rder to future
Firms responding Frequency (total value)/Lateral percen	831 ent 831	105 277.00	~	3.81	81	17.14	w	4.76	01	9.52	6	
(1)Agriculture, forestry, and fisher (2)Mining (3)Construction	ner 5	000	, 000		000	000	000		000	000	000	999
(4) Food processing (5) Textiles (6) Puln and paner	9 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	. .		000	000	888		888		33.33	000	888
(7)Printing and publishing (8)Synthetic chemicals	62 3 <u>.</u>	200	000		0	25.00			•••	900	-o	25.00
<pre>(9)0ils, fats, and paints (10)Pharmaceuticals (11)0ther chemicals</pre>	33 38 35	34 16	o		- m m	22.00 50.00			⊃ m ⊶	25.00 16.67		0.80
(12)Petroleum and coal products (13)Plastic products	224	, m O m	000		-00	9.69	00-		000	999	000	888
(15)Ceramics (16)Iron and steel	2 2 S	, eo eo	,00		0	20.00	400		•••	000		988
(17)Nonferrous metals (18)Metal products		225	o o -		-0-	25.00	00-		000	000	000	888
(2 0) Electrical machinery and appliance (2 1) Communications, electronics, and		55.4 5.4 5.4	-00		P prof prof	5.26 16.67	40 0		0	5.26 0.00		900
electrical measuring instrumen (2 2)Automobiles (2 3)Other transport machinery	4-0	7 98	~0 .		806		m0		m0	20.00	00-	0.00
<pre>(2 4)Precision machinery (2 5)Other industries (2 6)Transportation, communications, ar</pre>	\$4.75 a	D 9 0	~00	0.00	000	 	000	888	000	888	-00	988
public utilities (27)Other types of industries	11	2	0	0.00	•	0.00	•	0.00	0	0.00		0.00
uc.	Reasons for	setting up R&D	D strongpoints		.seas∬n	overseasUnited States	co.					
By scale of capital	24 B	Frequency (total value)	To provi stimulus entire o	To provide stimulus to the entire company	We came R&D stro through tions of firms	We came to own R&D strongpoints through acquisi- tions of overseas firms		For affiliated firms to make inroads overseas	In order not to lag behind in the industrial	not to nd in strial	To make the r of our firm p trate in order facilitate fu production, s	m penerider to future, sales
Frequency (total value)/Lateral percent	831 ent 831	277.00	~	3.81	18	17.14	ß	4.76	10	9.52	က	2.86
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5)More than ¥100 billion	80 - 5 80	2222 245 245	0-	84.05- 60.05 80.00 80.00	6464 4	25.00 18.18 20.00 7.69	~4000	18.33 0.00 0.00 0.00		8.33 13.64 13.16 5.00 0.00		8.33 0.03 0.00 0.00

Reasons for setting up R&O strongpoints overseas--Western Europe

To secure and use superb genius over- seas	33.93	0.0	0.00	0	36	36		36	9.00	00.0	0.00	30.00	9.00	00.0	9.0	20.00	100.00	9.0	100.00	100.00	42.86	60.00	25.00	99 99	100	20.00	0.00	0.00		0.0	**	F	lo secure and use suberb	genius over-		33.93	0	27.27	28.57	\$.00 • .00 • .00 • .00	
To se use geni geni	19	0	0	-	• <	> <	> c	> 0	> 0	>	9		>	۰ د	> •	٥.		0		_	~	φ.	-	c	ه د	>	• 0	0	•	•		<u>-</u>	O Se	genic	Seas	13	•	o ú3	ω.	٠.	
To promote joint research with universities and firms in other countries	25.00	0.00	00.00		36	3	9	36	9.0	9.69	0.00	20.00	9.0	9.6	0.00	00.00	100.00	100.00	100.00	0.00	28.57	30.00	0.00	11 11	11.0	36	00.0	0.00		o. 0		lo promote joint	research With universities and	firms in other	countries	25.00	. SO 00	900	28.57	40.00 40.00	
Tese university firm	1	0	0	-	.	> c	> <	> 0	> •	٥,	91	n	> (٥,	3	۰.	-		-	0	~	es e	>	-	- c	- C	•	0	,	0		0	unive	firm	COULT	=	-	-0	φ,	~	
To search for technology seeds (securing basic research infor- mation)	14.64	9.00	0.00	000		200	96	9	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.0	0.00	0.00	100.00	0.00	42.86	50.00	20.00	77 78		20.00	100.00	0.00	;	00.0		search for	echnology seeds	يَ	(uo	19.11	100 00	27.27	38.10	00.00	
To E	22	0	0		-	- د	> c	> <	>	> •	> (m (> 0	9	>	> 0	>	0		0	(C)	ın e	7	٢		-		0	,	0	ابه	0	Tech Second	rese	mation)	25	•	9 cy	80 (ρ φ	
R&O that copes with overseas needs, R&O for purpose of im- proving products	69.64	0.00	0.00	0			36		100.00	0.00	100.00	20.02	100.00	0.0	9.0	9.0	0.0	0.00	0.00	100.00	42.86	80.00	75.00	77 78		100.00	100.00	0.00	;	0.0	strongpoints overseas—"Western Europ	R&U that copes	with overseas needs R&N for	se of im-	ing products	69.64	00	81.82	66.67	89. 80. 80.	
	39	0	9	•	- •	→ C	>	> -	~ •	٥.	~•		·> (-	۰ د	•	>	0	0		60 (œ «	'n	-		- ~		0	•	•	Seas	R&D 1	With peda	purpose	proving	33	-	۰	ĭ	D (O	•
To strengthen technological power of prodyc- tion strongpoints	32.14	0. 0. 0.	0.00	0		96			70.00	9.0	9.00	00.00	90.00	9.0	9.0	0.00	0.00	0.00	0.00	100.00	28.57	50.00	25.40	77 77		00.00	00.0	0.00	;	0.0	gpoints over	;	o strengthen echnological	power of produc-	strongpoints	32.14	6	36.35	28.57	23. 23. 20.09	
To str techno power tion s	82	0	0	· c	-	- c	> <	> -	۰,	> (-	٥.	7	٥,	٠.	-	-	0	0		~	s.		,		- 0		0	•	0		,	to str	Power	tion	90	•	-	φ.		•
Frequency (total value)	56 144.00	0	0	. ~	·	3 C	> 0	> <	η.	···• ·	;	5 2	~ (۰ د	۰.	0	, Co	~	ന	m	16	ဝင္ပ	10	76	,	.	. ~	0		•	setting up R&D		Fraguescu	(total	value)	144.00	4	2 °	533	35 5 7	
	831 1831			. 0	40) (i	0.	20.0	י כיי	29		90 E	۲ د د د	90 f	00 I	و ما	3.5	36	30	23		7				976			1	11	sons for		Mimber	firms		at 831	6	199	240		3
By type of industry	Firms responding Frequency (total value)/Lateral percen	(1)Agriculture, forestry, and fisher	(2)Mining	(3)Construction	(1) Food processing	(F) Tox+1 oc con oc	(c) Dilly and many	(a) out and paper	furustrand and bornsurd	(8) Synthetic chemicals	(9) Ulls, fats, and paints	(10)Pharmaceuticals	(1 1) Other chemicals	(1 2) Petroleum and coal products	(13) Plastic products	(1 4)Kubber products	(1 3) Leramics	(16) Iron and steel	(17)Nonferrous metals	(18)Metal products	(19)Machinery	(20)Electrical machinery and appliance	(Z 1)Communications, electronics, and	electrical measuring instruments	Sattomionnu(7.7)	(2.3)Utner transport machinery (2.4)Procision machinery		(26) Transportation, communications, a	public utilities	(2 1)Other types of industries	Rea		By scale of capital		Tribucosot sarit	Frequency (total value)/Lateral percen		(1)¥1 to 5 billion (2)¥5 +0 10 killion	(3)¥10 to 50 billion	(4) ¥50 to 100 billion	(3) More than *100 billion

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Frequency (total value)/Lateral percent 831 56 6	888 831 11 2 4 28	To provide stimulus to the entire company	R&U strongpoints through acquisi- tions of overseas firms	For affiliated firms to make inroads overseas	In order not to lag behind in the industrial	of our firm pene- trate in order to facilitate future production, sales
\$2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10 -4 07 C	'n	8 14.29	4 7.14	5 8.93	1 3 5.36
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82 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-	o c	000	0.00		
Sons for setting up R&D strongpoints Number Frequency To provide Surveyed value) Sons 6 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		ė	.			
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11 1 1 0 0.0 18		ö	•	; ;		0.0
38 25 1 10.0 35 7 0 0.0 18 0 0 0 0.0 32 3 0 0 0.0 33 5 2 3 0 0.0 34 16 0 0 0.0 39 10 0 0 0.0 14 2 0 0 0.0 15 0 0 0 0.0 16 18 30 0 0.0 17 24 1 11.1 18 3 0 0 0.0 17 0 0 0 0.0 18 31 11.1 18 31 14.00 3 5.3 18 31 4.70 3 5.3		ö	Ö	6		0.0
18 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				,		20.
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Reasons for setting up R&D strongpoints overseas--Asian NIEs

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To promote joint research with universities and firms in other countries	1 4.55	0.00	0.00							0.0								~		0.00	0.00	0.00		2	0.00		To promote joint	research with universities and	firms in other		1 4.55	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
To search for technology seeds (securing basic research information)	13.64	88	000	20.00	0.00	0.00	9.0	9	100.00	00.0	0.00	9.00) - -	86	000	0.00	20.00	0.0	0.00	0.00	00.0	0.00	0.00	00.0	0.00		o search for	echnology seeds securing basic	research infor-		3 13.64	0000	
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By type of industry	Firms responding Frequency (total value)/Lateral percen	(1) Agriculture, forestry, and fisher	(2)Mining	(A)Food processing	(5) Textiles	(6)Pulp and paper	(7)Printing and publishing	(8) Synthetic chemicals	(9)Oils, fats, and paints	(1 U) Pharmaceuticais (1 1) Other chemicals	(12)Petroleum and coal products	(13) Plastic products	(1 4)Rubber products	((10)Iron and steel	(18)Wetal products	(19)Machinery	(20)Electrical machinery and applianc	(2 1) Communications, electronics, and		(2 2)Automobiles	(2 3)Uther transport machinery (2 4)Procision machinery	(25)Other industries	(26) Transportation, communications,	public utilities (2 1)Other types of industries			By scale of capital		Firms responding	Frequency (total value)/Lateral percent	(1) ¥1 to 5 billion (2) ¥5 to 10 billion	(4) ¥50 to 100 billion

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Cooperating with and coming to an understanding with main office in Japan or overseas production site Company's overall w strategy on over i seas expansion is s inadequate s 0.00 50.00 50.00 50.00 60 60.00 60.00 60.00 60.00 60.00 60.00 60.00 60.00 60.00 60.00 60.0 Research management problems at R&D strongpoints overseas--Europe and the United States Expenses are too high Treatment of intellectual property rights Regulations and systems of the government there Frequency (total value) 106 247.00 Number firms surveyed 3862333 TT33178318398 (10) Pharmaceuticals
(11) Other chemicals
(13) Plastic products
(13) Plastic products
(14) Rubber products
(15) Geramics
(15) Geramics
(16) Iron and steel
(17) Nonferrous metals
(17) Nonferrous metals
(18) Metal products
(19) Machinery
(20) Electrical machinery and appliance
(21) Communications, electronics, and
electrical measuring instruments Firms responding Frequency (total value)/Lateral percent (1)Agriculture, forestry, and fisher (5) Textiles(6) Pulp and paper(7) Printing and publishing(8) Synthetic chemicals (9)0ils, fats, and paints (4) Food processing By type of industry (2)Mining (3)Construction Question 4.

By scale of capital Research management problems at R&D strongpoints overseas—Europe and the United States and coming to an understanding times (total systems of the intellectual Expenses are seas expansion is seas production surveyed value) government there property rights too high inadequate site frequency (total value)/Lateral percent 831 247.00 30 28.30 19 17.92 26 24.53 27 25.47 29 27.36 (1) #1 to 5 billion 308 29 4 33.33 4 33.33 4 33.33 3 25.00 2 20.00 12 30.00 2 20.0
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By scale of capital Number Frequency Regulations and Treatment of Firms (total systems of the intellectual Expensive value) government there property rights too his strength of total value)/Lateral percent 831 247.00 30 28.30 19 17.92 26 (1) #1 to 5 billion 308 29 4 33.33 4 33.33 4 (55 7 (2) #5 to 10 billion 199 49 14 35.00 8 20.00 8 (4) #56 to 10 billion 45 51 8 35.30 8 20.00 8 (5) #56 to 10 billion 45 51 8 35.30 8 20.00 2 20.00 2
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By scale of capital Number Frequency Regulations and Treath Firms (total systems of the intell surveyed value) government there proper 831 106 Frequency (total value)/Lateral percent 831 247.00 30 28.30 19 (2) ¥5 to 18 billion 199 49 1 4.55 1 (3) ¥10 to 50 billion 240 94 14 35.00 8 (4) ¥50 to 180 billion 240 94 3 30.00 2 (5) More than \$180 billion 39 24 3 30.00 2
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By scale of capital Number Frequency Regula firms (total system surveyed value) govern 831 106 Frequency (total value)/Lateral percent 831 247.00 30 (1) #1 to 5 billion 308 29 4 (2) #5 to 100 billion 199 49 11 (3) #10 to 50 billion 240 94 14 (4) #50 to 100 billion 240 94 14 (4) #50 to 100 billion 240 94 14 (5) More than #100 billion 35 51 8 (5) More than #100 billion 39 24 8
By scale of capital Number Frequency firms (total surveyed value) Firms responding 831 106 Frequency (total value)/Lateral percent 831 247.00 (1) #1 to 5 billion 308 29 (2) #5 to 10 billion 199 49 (3) #10 to 50 billion 199 49 (4) #5 to 10 billion 45 51 (5) More than #100 billion 45 51
By scale of capital Firms responding Frequency (total value)/Lateral percent 831 (1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion (4) #50 to 100 billion (5) More than #100 billion (6) More than #100 billion
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(2.2) Automobiles (2.3) Other transport machinery (2.4) Precision machinery (2.5) Other industries (2.5) Other industries (2.6) Transportation, communications, ar

(27)Other types of industries

Resear	Ę	management problems at R&D strongpoints overseasEurope and United States	ems at R&	D strongp	oints over	rseasEu	irope and U	nited Stat	8	۵	Oc danceood	10000
By type of industry	Number firms surveyed	Frequency (total value)	Ensuring R&D personnel over seas		talented people dispatched over- seas by our company		High turnover in researchers, and accumulation of technology delayed	rer in i, and in of delayed	Efficient vield of R&D results		ments and other such aspects of research environ ment are differ	dother ects of environ- different
Firms responding Frequency (total value)/Lateral percent	831 831	106 247.00	31	29.25	36	24.53	φ	5.66	72	22.64	01	9.43
(1) Agriculture, forestry, and fisher	so -		00	9.0	00	9.6	5	0.0	00	9.6	00	0.00
(2)Mining (3)Construction	~ €	-	> 0	30	>0	20.0	> ©	200	>	900	>	00.0
(4) Food processing	3 0	•=	• •	.00	• 64	40.00	•	0.00	~	4 0.00	0	0.0
(5) Textiles	5 8	. m	0	0.00	0	0.0	•	0.00		100.00	0	0.00
(6)Pulp and paper	13	~ c	00	96		20.00	- -	9.6	C	20.00	o -	100.00
(8) Synthetic chemicals	29	. E.	> ~~	20.02	~	40.00	. 0	.0		20.00	•0	0.0
(9) Oils, fats, and paints	11	25	٥٦	0.00 77	 ≪	50.00	۰ د	0.00		30.00	• •	9.00 25.38
(1 U) Tharmaceuticals (1 1) Other chemicals	3 S	2 82	+ 1/3	83.33	. e-	33.33	40	0.0	•	0.0	3	16.67
(12) Petroleum and coal products		, en e	0	9.0	00	9.6	-	9.6	00	9.6	• •	9.0
(1 3)Plastic products (1 4)Rubber products	 	o ~	00	38	- 0	88	- •	38	90	38	>	100.00
_	35	ı es	0	00.0	•	0.00	•	0.00	<u>,</u>	50.00	0	0.0
(16) Iron and steel	98	r) t	۰ د	9.00	c	100.00	0 c	9.6	-	9.6	0 0	9.0
(18)Wetal products	23.0	- m	-	100.00		.0	• •	.0	• •	9.0	•	8
(1 9)Machinery	3	œ :		10.00	₩.	40.00	۰,		۰,	10.00	F	10.00
<pre>(2 V)tlectrical machinery and appliance (2 l)Communications. electronics. and</pre>	20 CS	15		20.00	- ~	25.00	•0	0.0	• ~	25.00	,0	0.00
electrical measuring instruments	•	;			•	6	•	•		:	•	;
(2 2)Automobiles (9 3)Other transport machiness	-		-	20.02	~ ~	23.03	>	90	nc	38.46		96
(2 4) Precision machinery	22	20.	. ~	25.00	· 67	37.50	0	0.0	• 67	37.50	•	12.50
(25)Other industries	(~	~	20.00	00	88	-	88	00	9.6	00	0.0
(20/ Fransportation, communications, and profile of the communications, and th		>	>	20.0	>	3	>	•	>	2.5	>	9
public utilities (2 1)Other types of industries	11	64	•	0.00		100.00	•	0.00	0	0.00	, •	0.00
Res	earch mana	Research management problems at R&O strongpoints overseasEurope and United States	lems at R	&D strong	points ove	erseasE	urope and l	United Sta	tes	•		
					Not enoue talented	gh people	High turnover in	ver in			Research assessments and other	assess- i other
By scale of capital	Number firms surveyed	frequency (total value)	Ensuring R&D personnel over- seas	R&D 1 over-	dispatched over- seas by our company	ed over- our	researchers, accumulation technology d	s, and on of delayed	Efficient vield of R&D resul	. s	such aspects of research enviro ment are differ	cts of environ- different
Firms responding Frequency (total value)/Lateral percent	80 80 33 33 34 34 34	106 247.00	31	29.25	56	24.53	'	5.66	72	22.64	10	9.43
(1)¥1 to 5 billion	308	29	m	25.00	က	25.00		8.33	2	16.67	84	16.67
(2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion	240 450 550	548	<u> ក</u> ដីក	31.82 32.50 22.73	9 0 9 9 0 9	27.27 25.00 27.27	~ ~ ~	. 5.00 . 5.00 . 5.00	6 0 (1) 60	27.27 12.50 36.36	-40	10.00 0.00
(5) More than ¥100 billion	38	77	m	30.00	-	10.00	•	0.0		30.00	m	30.00

Research management problems at R&O strongpoints overseas--Asia

Cooperating with and coming to an understanding with main office in Japan or overseas production site	7 29.17	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10000000000000000000000000000000000000	Cooperating with and coming to an understanding with main office in Japan or overseas production site	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Company's overall strategy on over- seas expansion is inadequate	8.33			overall on over- nsion is e 8.33	12.50 11.11 0.00 0.00
Company's strategy o seas expan inadequate	~		00000	Company's strategy seas expa inadequat	000
Expenses are too high	4.17		00000 0	ses are iqh 4.17	0.0000
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ts overseas As Treatment of intellectual property rights	8.33	888888888888888888888888888888888888888	000000000000000000000000000000000000000	ts overseas Asi Treatment of intellectual property rights	0.00 0.00 11.11 25.00 0.00
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s at R&D strongpoor Regulations and systems of the government there	50.00	100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00	00.00	s at R&D strongpoints overseasAsia Regulations and Treatment of systems of the intellectual qovernment there property rights	100.00 25.00 66.67 50.00
lems at Regul syste gover	12	0000000000000000000000000	0-000 0		00000
ge F	50.00		ო NOOO O	management problems at veryed value) gover 1 50.00 12	보였습니다
	831		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Number of First	308 3450 3950
Resear By type of industry	Frequency (total value)/Lateral percent	(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmaceuticals (10) Pharmaceuticals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (13) Ceramicals (15) Ceramicals (15) Ceramicals (16) Iron and steel (17) Nonferrous metals (18) Metal products (20) Electrical machinery and appliance (21) Communications, electronics, and electrical massuring instruments	(2 2) Automobiles (2 3) Other transport machinery (2 4) Precision machinery (2 5) Other industries (2 6) Transportation, communications, ar public utilities (2 7) Other types of industries	Researd By scale of capital Finds responding Frequency (total value)/Lateral percent	(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5) More than ¥100 billion

Kesea	arch manag	rch management problems at R&D strongpoints	ems at R&I	strongb	oints ove	overseasAsia	ia			ć	1-1-1-1	
By type of industry	Number firms surveyed	Frequency (total value)	Ensuring R&D personnel ove seas	Ł	Not enough talented people dispatched over seas by our company	•	High turnover in researchers, and accumulation of technology delayed	ver in s, and on of delayed	Efficient yield of R&D results			assess other other other different
Firms responding Frequency (total value)/Lateral percent	831 831	24 50.00	7	29.17	თ	37.50	m	12.50	-	16.67	80	8.33
		,	,		•	;			•	•	•	•
(1) Agriculture, forestry, and fisher	1 0 -	00	00	88	00	88	00	66	00	96	-	0.0
(2)Construction	~ &	> <	> C	88	, 0	96.		0.00	>0	0.0	, 0	9.0
(4)Food processing	200	o vo		9.0		0.0		0.00	~ ~	66.67		0.00
(5) Textiles	92	0	0	0.00	0	0.0		0.00	-	0.0	•	0.0
(6)Pulp and paper	19	0	0	9.0	0	8.0		0.00	-	9.0	0	9.00
(7)Printing and publishing	س ڙ	۰ د	00	88	-	9.6		90	o -	9.00		96
(8) Synthetic Chemicals	7 -	o ~	•	88	۰ د	20.00		20.05	- c	0.0	• 6	00.0
(9/Ulls, Tats, and paints (1.0)Pharmacouticals	- 00 - 67	• 67	-	100.00	10	0.0		0.00	• •	9.0	•	0.0
(11)Other chemicals	35	00	, ,	66.67		33.33		33.33	0	0.0	0	0.00
(1 2) Petroleum and coal products	80	0	0	86	0	9.0		0.0	-	9.6	-	9.00
(13)Plastic products		> ~	- C	38	> C	36		100.00	- 0	90	.	90
(15) Teramics	32	, 0	• •	8	•	90.0		0.00	•	0.0	0	0.00
(16) Iron and steel	36	0	0	0.00	0	0.00		0.00	0	0.0	0	0.00
(17)Nonferrous metals	88	٥.	00	88	o -	99		8.0	-	9.6	-	9 6
(18)Metal products	22		> ~	200	e-:	20.09		000	• 0	90	-	20.00
(19) Machinery (20) Electrical machinery and appliance	* *	:-	> —	20.00	-	20.00		0.00	•	0.00		20.00
(2 1) Communications, electronics, and	39	0	0	0.00	0	0.00		0.00	0	0.0	0	0.00
electrical measuring instruments (2 %)Automobiles	1.7	**	c	00.00	_	100,00	•	0.00	-	100.00	0	0.00
(2.3)Other transport machinery	; ∞ ~	. 62	0	0	•	0.00	0	0.00	0	0.00	0	0.00
(2 4)Precision machinery	77	00	00	88	00	96	-	9.6	0 C	9.0		900
(2.5)Uther industries (2.6)Transnortations at	5 6		-	88	•	88	•	99		.0	•	.00
public utilities	3	•							,		•	•
(27)Other types of industries	1.1	0	0	0.00	0	0.00	0	0.00	0	0. 0	0	0.00
Rese		arch management problems at	lems at RU	R&D strong	points ov	strongpoints overseasAsia	Asia					
					Not enot	igh I people	High turn	over in			ments and other	ssess- other
By scale of capital	Number firms surveyed	Frequency (total value)	Ensuring R&D personnel over seas	R&D 1 over-	dispatch seas by company	dispatched over- seas by our company		researchers, and accumulation of technology delayed	Efficient vield of R&D resul	φ,	such aspects of research enviro ment are differ	cts of environ- different
Firms responding Frequency (total value)/Lateral percent	831 831	50.00		29.17	60	37.50	က	12.50	-	16.67	2	8.33
				;	•		•	;		:	•	•
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5)More than ¥100 billion	21308 24098 35098	118811	0 m m m 0	23.50	09-40	75.00 11.11 50.00 0.00	02040	22.00 0.00 0.00 0.00	-0-80	50.00 50.00 50.00	90H0H	100.00

R&D strongpoints on Information about	
Effects of establishing European and U.S. R&D strongpoints or Japanese R&D strongpoints	
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32 | 36 | 30 | 23 | |
 | | | ~ | 81 | 24 |
 | ~ | 1.1 | te of out | nese R&D s |
 | Number | firms | n | 86 | 3
 | 308 | 240 | | ; |
| By type of industry | Firms responding
Frequency (total value)/Lateral percent | (1) Ancientine forestry and fisher | (9)Mining | (3)Construction | (4) Food processing | (5) Textiles | (6)Pulp and paper | (7) Printing and publishing | (8)Synthetic chemicals | (9)0ils fats and naints | (10)Pharmaceuticals
 | (11)Other chemicals | (12)Petroleum and coal products | (13) Plastic products | (1 4)Rubber products |
(15)Ceramics | (16)Iron and steel | (17)Nonferrous metals | (18)Metal products | (19)Machinery | (20) Electrical machinery and appliance
 | (21)Communications, electronics, and | electrical measuring instruments | (2 2)Automobiles | (2 3)Other transport machinery | (2 4) Precision machinery | (2 2)Other industries
 | (2 b) ransportation, communications, ar | public utilities
(2 %)Ather types of industries | 1 | Japan | -
 | • | By scale of capital | | Firms responding | riequency trotal value // Lateral percent
 | (1)¥1 to 5 billion | (3) ¥10 to 50 billion | (4) ¥50 to 100 billion
(5) More than ¥100 billion | |
| | number requency with turbpe and seeds trecimology to with state instructionalize firms (total U.S. will be seeds) will be constitusness research surveyed value) easier acquired of researchers management | number frequency with Europe and seeds will be constitueness research U.S. will be seeds will be constitueness research No expectations surveyed value) easier 62 62 6 6 5.36 15 13.39 0 0.0 | number requency with Europe and seeds) will be consciousness research (total U.S. will be seeds) will be consciousness research No expectate surveyed value) easier acquired of researchers management No expectate 831 112 26 23.21 62 55.36 6 5.36 15 13.39 0 5.36 5 5.36 15 13.39 0 5.30 5.30 6 5.30 7.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Aurical U.S. will be seeds) will be consciousness research total U.S. will be seeds) will be consciousness research serviced value) acquired of researchers management No expectate surveyed value) 26 62 62 65.36 6 5.36 15 13.39 0 831 112.00 26 23.21 62 55.36 6 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researchers management No expectate surveyed value) 26 23.21 62 55.36 6 5.36 15 13.39 0 5 12.00 0 0.00 0.00 0 0.0 | Figures (total U.S. will be seeds) will be consciousness research No expectate surveyed value) easier acquired of researchers management No expectate surveyed value) 26 23.21 62 55.36 6 5.36 15 13.39 0 5 5 5 5 6 5 5 6 5 5 6 5 6 5 6 5 6 5 6 | ### Consciousness research Consciousness C | ### Creditable Consciousness Consciousness | Firms (requency With Europe and seeds) will be consciousness research (total 12.00 26 23.21 62 55.36 6 5.36 15 13.39 0 12.00 26 23.21 62 55.36 6 5.36 15 13.39 0 12.00 0 0 | Firms requency With Europe and seeds will be consciousness research (total u.s. will be seeds) will be of researchers management No expectate surveyed value) easier acquired of researchers management No expectate surveyed value) 26 23.21 62 55.36 6 5.36 15 13.39 0 1.00 0 0.00 0.00 0.00 0 | ### Crossing Consciousness research Consciousness Consciou | Firms (regularly With 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Creaming Consciousness Consciousness | Firms (total U.S. will be seeds) victimized (total U.S. will be acquired of researchers management No expectate surveyed value) easier (total U.S. will be acquired of researchers management No expectate surveyed value) easier (total U.S. will be acquired of researchers management No expectate surveyed value) easier (total U.S. will be acquired (total U.S. will b | Firms (total U.S. will be seeds) will be consciousness research seeds will be seeds will be of researchers management No expectate surveyed value) 831 112 26 23.21 62 55.36 6 5.36 15 13.39 0 83 | ### Creaming the part of the p | ### Creaming the part of the p | ### Frequency With the seeds Will be consciousness Fessarch No expectate ### Sill 112.00 26 23.21 62 55.36 6 5.36 15 13.39 0 ### Sill 112.00 26 23.21 62 55.36 6 5.36 15 13.39 0 ### Sill 112.00 26 23.21 62 55.36 6 5.36 15 13.39 0 ### Sill 112.00 26 23.21 62 55.36 6 5.36 15 13.39 0 ### Sill 12.00 0 0.00 0 0.00 0 0.00 0 ### Sill 12.00 0 0.00 0 0.00 0 0.00 0 ### Sill 12.00 4 80.00 0 0.00 0 0.00 0 ### Sill 13 23.08 6 46.15 1 7.69 3 23.08 0 ### Sill 20.00 0 0.00 0 0.00 0 0.00 0 ### Sill 20.00 0 0.00 0 0.00 0 0.00 0 ### Sill 20.00 20.00 0 0.00 0 0.00 0 0.00 0 ### Sill 20.00 3 100.00 0 0.00 0 0.00 0 ### Sill 20.00 3 100.00 0 0.00 0 0.00 0 ### Sill 20.00 3 100.00 0 0.00 0 0.00 0 ### Sill 30.00 30.00 30.00 0 0.00 0 ### Sill 30.00 30.00 30.00 0 0.00 0 ### Sill 30.00 3 3.27.27 0 ### Sill 32.50 4 44.44 2 11.11 3 16.67 0 ### Sill 32.50 0 0.00 0 0.00 0 ### Sill 32.50 0 ### Sill 3 | ### Constitutions of testands of researchers management No expectations surveyed value) easier acquired in the constitutions of researchers management No expectations easier acquired in the constitutions of researchers management No expectations of testal in the constitution of the constitutions of the | Firms (total of seeds) will be seed of researchers management to easier acquired value) easier 5.3 13.3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 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REB strongoints or easier 15 23.38 13.39 10 0.00 0 Signature orange and u.s. REB strongoints or easier 15 3.30 0 0.00 0 Signature (total orange and u.s. REB strongoints and researchers management to easier 15 2.30 0 0.00 0 0.00 0.00 0.00 0.00 0.00 | Times | Signature Credit Credit Control Cont | ### Communications are acquired to present the search of the constitutions of the constitutions are acquired to the constitutions are acquired | ### City City |

Content of research at R&D strongpoints overseas, now

Question 6.

By type of industry	Number firms surveyed	Frequency (total value)	Development of products that correspond to market in area	pment of ts that pond to in area	Research for purpose of i ing producti	Research for purpose of improv- ing productivity	Resear clear tions	Research to clear regula- tions there	Development o what will be- come core technologies	lopment of will be- core nologies	Basic	Basic research
Firms responding Frequency (total value)/Lateral percent	831 831	116 189.00	87	15.00	88	24.14	11	14.66	21	23.28	77	20.69
(1) Agriculture, forestry, and fisher	v	•	~	5	c	00	-	00 0	c	00.0	o	00.00
(2)Mining	, ~	• •		0.0		00.0	•	~ 00.0	. 0	0.00	0	0.0
(3)Construction	82	. 0	0	0.0	0	0.00	0	0.00	0	0.00	0	0.00
(4)Food processing	20	10	~	66.67	ო	50.00	0	0.00	~	33	-	16.67
(S)Textiles	5 6	~	 (100.00	٥.	0.00	0	0.0	«	100.00	0	200
(6) Fulp and paper	5.	m (~ -	100.00		50.00	00	96	-	96	> C	36
(8) Synthetic chemicals	າ 29	4 60	- vo	100.00		20.00	•	0.0	•	80.	~	4 0.00
(9) Oils, fats, and paints	=	ω	~	100.00	0	0.00	~	29.99	0	0.00	-	33.33
(10) Pharmaceuticals	د د د	<u></u>	بر دی ر	41.67		 	→ ¢	33.33	~	16.67	→ «	33.33
(1 2)Detroloum and coal products:	ç ≃	n	n =	200	- €	00.00	- 6	98		100.00	4 O	00.0
(13)Plastic products	22	••		0.00		0.00	. 0	0.0	0	8.0	0	0.00
(1 4) Rubber products	وع	~ 1	۰,	9.0	٠.	100.00	0	0.0	0-	9:	٥-	3.00
(15)Leramics (15)Iron and etem]	25 25		2 C	00.00	~ ¢	25.05	>	38	- -	100.00	-0	00.0
(17)Nonferrous metals	88	4 (0)	• m	15.00	. 0	00.0		0.6	. ~	20.00	0	0.0
(18) Metal products	23	س	~	100.00	-	50.00	0	0.00	0	0.00	0	86
(19)Nachinery	3	12	2:	76.92	တ	66.15	-	0.00	ے دن	23.08	7 9 U	13.55
(2 V) Electrical machinery and appliance	÷ 6	1.5	ğ v	70.00	-) <u>-</u>	12.53	7 F	27.50	+ e4	37.50	o 64	25.00
<pre></pre>	3	:	•				•		•	.	,	
(22)Automobiles	7	25	11	73.33	9	40.00	~	13.33	erò i	20.00	84	13.53
(2 3)Other transport machinery			€4 6	100.00	0.	0.0		50.00	•	9.00		96
(2 4)rrecision machinery (2 5)Other industries	3 2	79 T	۰ ۵		- •	00.0		20.00	, 0	00.0	,	50.00
(2 6) Transportation, communications, ar	- ~	•		9	•	0.00	•	0.0	0	0.00	0	0.0
public utilities			_	100 00	c	6	~	5	•	0,00	0	0.00
ٽ	بر م	research at R	R&D strong	points o	strongpoints overseas, now	;	•	•	•			
			Develor	, ot		:			51000			•
By scale of capital	Number firms surveyed	Frequency (total value)	products that correspond to market in area	ts that pond to in area	Research for purpose of it in Ind producti	Research for purpose of improv- ing productivity	Resear clear tions	Research to clear regula- tions there	what will be come core technologies	vevelopment of what will be- come core technologies	Basic	Basic research
Firms responding Frequency (total value)/Lateral percent	831 831	116 189.00	84	15.00	28	24.14	11	14.66	2.2	23.28	7.7	20.69
		23	10	- 60	-	53.85	•	23.08	67	23.08	0	0.00
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion	240 450 450	40m	1225	80.77 78.05 68.18		26.92 17.07 27.27	w w m e	19.23 13.64 13.64	ကတယ္ဖ	21.95	⊕ ∞ ∾ ⊦	23.08 19.51
(5) More than ¥100 billion	en M	\$2	2)		-	1 .14	>	3	•	96.94	-	

Content of research at R&D strongpoints overseas, after five years

Basic research	19.47	100.00 10	20.00 12.50 0.00 0.00	research 19.47	0.00 20.00 17.50 18.18
Basic F	22	000-000-400000-0000	mo	Basic r	08640
Development of what will be- come core technologies	46.02	100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	26.67 0.00 62.50 100.00 0.00	Development of what will be- come core technologies	88. 81.50 81.50 83.82 85.83
Develowhat come technot	25	000000000000000000000000000000000000000	4010-0	Devel what come techn	2082-
Research to clear regula- tions there	12.39	22000000000000000000000000000000000000	20.00 50.00 0.00 0.00	Research to clear regula- tions there 14 12.39	23.08 16.00 7.50 13.64
	=	000000mm0000000mm	3 0 0 0 0 0 0 0		6466 €
Research for purpose of improv- ing productivity	18.58	20.00 10.00 10.00 10.00 10.00 10.00 10.00 11.11	26.67 3 0.00 1 0.00 0 0.00 0 0.00 0	Research for purpose of improv- ing productivity 21 18.58	53.85 16.00 72.00 7.69
Researc purpose ing pro	21	000400-00000000000000000000000000000	0 0 0 0 0 0 0	Research for purpose of ii ing productii	F4484
Development of products that correspond to market in area	72.57	00.00 100	11 73.33 4 2 100.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Development of products that correspond to market in area	69.23 70.00 81.82 69.83
Develo produc corres market	28	0008-8-88888-0-88888	11 2 6 0 0 0 1 1 R&D stro	Develor produc corres	0 0 0 0 0 o
Frequency (total value)	113	000128888888001088884	26 13 1 0 1 1 research at R	Frequency (total value) 113	70907 2091-5
Number firms surveyed	831 831	24400000000000000000000000000000000000	47 18 24 14 26 26 17 ntent of r	Number firms surveyed 831	308 240 39 39
By type of industry	Firms responding Frequency (total value)/Lateral percent	(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmaceuticals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (13) Lastic products (13) Commics (15) Ceramics (15) Ceramics (15) Ceramics (15) Ceramics (15) Matal products (18) Matal products (18) Matal products (19) Matal products (19) Matal products (19) Matal products (19) Mataliery and appliance (21) Communications, electronics, and	electrical measuring instruments (2.2)Automobiles (2.3)Other transport machinery (2.4)Precision machinery (2.5)Other industries (2.6)Transportation, communications, ar public utilities (2.7)Other types of industries Cor	By scale of capital Firms responding Frequency (total value)/Lateral percent	(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion

Why some Japanese firms do not establish R&O strongpoints overseas R&O strongpoints in Japan are

Question 9.

			an Japa	in Japan are sufficient, and						٠.		
By type of industry	Number firms surveyed	Frequency (total value)	there is to estab overseas	re is no need establish erseas	R&D o	overseas inefficient	Coping w	ping with local stems is a lot trouble	Cannot set up points	afford to strong- overseas	Risk is	hiqh
Firms responding Frequency (total value)/Lateral percent	831 int 831	698 698.00	362	51.86		17.1	15	2.15		26.50	23 23	3.30
(1)Agriculture, forestry, and fisher		le?	~	_	-				•		·	90
(2)Mining		· -	· ~	0			•		۰.		•	
(3)Construction	82	80	82	0	-	'n	~	•	21	vi		1.25
(4)rood processing	0	4.0	53	on c	0		0	•	=:	-	<	2.21
(5) extites (6) Puln and namer	9 0	ç;	<u>~</u> :	-			0	•	≘`	٠, د	-	25
(7)Printing and publishing	n er	-	51-	• •	> <	•	> c	•	- C	, c	> <	36
(8)Synthetic chemicals	62	55.	21	38.18	۰ ۵	3.6	• •	.0	23.	,		1.82
(9) Uils, fats, and paints	end (œ	က	2	2		0		~	Š	0	0.00
(10)Pharmaceuticals	න භ	es 6	~ ((•	~		2	_	~	8.70
(117) Utner Cnemicals (12) Patroleum and coal products	ν α	5 Y	× =	au	~ <	•	-	•	٥٥	٠,	· -	9.30 2.50
(13) Plastic products	9 00	27	3 07	300	> ~~		-0		ı 🛶	; ~;	• •	0.00
(1 4) Rubber products	9	ស	8	0	0				· 67	6	0	0.00
(15)[eramics	23 80	23	23	∞ 1	0		0	•	='	÷,	~ .	6.90
(10)Iron and Steel	8 8	ب م	77	0	٥ (•	00	•	0		 -	7.34
(1 8) Wetal products	2 6	52	2 7	> u	~ c	•	76	•	۰ ~			75.76
(19) Machinery		202	27	3	~		۰.		15	;	•	2.00
(20) Electrical machinery and appliance		99	28	~	S		~		8		(C)	4.69
(2 1) Communications, electronics, and		3.	2	~	m		2		ص	œ,	~	6.45
(9 9) Outomokilos (9 9) Outomokilos	•	ç	:	ŧ	•		c		•	L	•	
(2.3)Other transport machinery	~ œ	25	- -	~ u	~ c		> ~	•	× ~	•	7 -	6.23
(2 4) Precision machinery	7.7	25	20	66.67	-	6.67		9.00	° ~	13.33	-0	00.0
(2 5)Other industries	_	12	တ	0	0		0		S		0	0.00
(26) Transportation, communications, ar	7	25	18	÷.0	0		0	•	S	•	0	0.00
public utilities (2.7.0) ther types of industries	11	16	9	37.50	2	12.50	0	0.00	~	25.00	_	6.25
	Why some Japa	Japanese firms d	do not es	establish R&D	strong	strongpoints overseas	seas					
Ru orala of canital			R&D str in Japa	R&D strongpoints in Japan are	ì			,				
	Number firms surveyed	Frequency (total value)	there is no to establish overseas	ent, and s no need blish is	R&D o	overseas	Coping with systems is a of trouble	ith local is a lot le	Cannot set up points	afford to strong- overseas	Risk is	high
Firms responding Frequency (total value)/Lateral percent 8	831 int 831	698 698.00	362 362	51.86			25	2.15	185 185	26.50	23	3.30
•												
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	308 240 39 39	291 190 23 25		54.30 48.52 49.47 60.00		4.00 6.00 6.00 6.00	₩ 4 ₽₩ 0	2.03 3.58 0.00 0.00	2004 2004 2004	25.77 32.54 17.39 16.00	=7 * 00	3.78 2.37 4.21 0.00 0.00

	•									
By type of industry	Number firms surveyed	Frequency (total value)	Both technological trade imports and exports	Both technology trade imports and exports	Only to trade ((value	Only technology trade exports (value received)	Only te trade i (value	Only technology trade imports (value paid out)		No technology trade
Firms responding Frequency (total value)/Lateral percent	831 831	813 813.00	291 291	35.79	107	13.16	124	15.25	291 291	35.79
7		4	•	6	•		•	6	,	
(a)Mining		o ~	-	9		2	> ~	, v.	• 6	200
(2)Construction	• 6	• 0	10	20.07	> V	9.0	7 [7.	* C	20.00
	70	0 0	21	900	n c		- u		9 6	
	5 u) c	34	200	n u	96	۳ د	20.00	2 -	200
(A) Pull ages	9 0	30	9 6	20.00	3 4	20.10	, c	20.0	:	20.00
(7)Printing and publishing	n e	n er	4 er	20.00	• =	70.0	4 C		-	00.0
(8)Synthetic chemicals	% %	. 6	25	36.67	•	11.67	• cc	13.33	23	38.33
(9) Oils, fats, and paints	11	1	מין	45.45	. 64	18.18	~	18.18	2	18.18
(10) Pharmaceuticals		35	22	62.86	-	2.86	, ro	14.29	-	20.00
Other chemicals	35	35	12	34.29	7	5.71	S	14.29	16	45.71
(12) Petroleum and coal products	®	17	ω,	35.29	0	0.00	-	41.18	~ .	23.53
(13) Plastic products		17	~ •	41.18	¢		❤ <	23.53	nc	28.62
(1 4) Kubber products	۽ ه	٠.	20	30.00	7 U	30.00	> ~		- <u>-</u>	
(1 6) [con and stee]	7 C	- v	n <u>c</u>	20.02	9	20.13	.	20.00	2.0	34.29
(17)Nonferrous metals	9 6	200	- -	36.63	.	16.67	3 (c	20.00	ુ જ	26.67
(18) Metal products	23	23		21.74	.	26.09	•	17.39	œ	34.78
	9	9	32	50.00	S	7.81	· თ	14.06	18	28.13
(20) Electrical machinery and appliance		85	8	40.24	15	18.29	13	15.85	21	25.61
1)Communications, electron		38	12	31.58	_	18.42	on	23.68	10	26.32
electrical measuring instruments	!	,			•			•	•	
N.	L	17	ဓ	ص د د	L (•	- ,	٠	(0)	12.77
(2 3)Other transport machinery	× 7	æ e	~ 5	38.83	. , -	27.78	⊸ •	n ·	n -	27.78
// #/rrecision machinery	32	? .	3 v	o u	- 6		o -	- ~	• (*	91.03
S)Uther Industries	36	9 0	o 4	. r	• •	•	• 6			76 99
.c. v. rransportation, communications, an	9	3	•	;	>	•	4	?		
(2 7)Other types of industries	11	11	10	29.41	-	5.88	က	17.65	00	47.06
Techn	Technology trade results	e results							•	
By scale of capital										
	Number firms	Frequency (total	c Ť	technology e imports	Only te	Unly technology trade exports	Unly te trade i	technology imports	No tec	No technology
	surveyed	(ante)	and exp	exports	(value	received	ivatue	paid out)	rrade	
Firms responding Frequency (total value)/Lateral percent	8831	813 813.00	291 291	35.79	107	13.16	124	15.25	291 291	35.79
(1) ¥1 +o 5 hillion	308	305	7	_	7	13.07	- 55	16.67	150	70.67
(2) ¥5 to 10 billion	199	195	25	26.67	9	20.53	30	17.95	00 (34.87
(3)*10 to 50 billion (4)*50 +2 100 b:11:22	240	229 45	119 20 20	. : .	27	11.79	~ «	17. 78	<u>م</u> ۵۵	17.45
(5) More than ¥100 billion	S) 00 r (7)	92	68.42	•	.0	, es	7.89		23.68

Technology trade results

Question 10.

	Only nonsubsidiaries	43.03	0.00	12.00	39.13	50.00	20.00	20.00	42.86	32.87	83.33	25.00	10.01	52.38	43.75	54.55	27.08	27.18		27.27	27.27	42.86	3.0	20.00		Only nonsubsidiaries	43.03	53.77 46.81 40.14 20.69 26.92
	Only nonsuba	173	o -	- o	, o	ا ھا	m r	25	~	3	w	~ ~	1	-=	•	6	<u>n</u> <u>~</u>	'n	:	<u> </u>	· ~	~ ·	,	~		Only nonsub	173 173	2489 2489 2489
	Mostly nonsubsidiares	26.87	0.0	32.00	30.43	.33	16.67	36.67	42.86	26.09	16.67	25.00	10.07	38.10	25.00	9.03	26.97	0.0	6	57.67	36.36	28.57	79.00	16.67		Mostly nonsubsidiares	26.87	20.75 17.02 34.69 34.48
	Mostly nonsubs	108	00	> ~	-		 <	> ==	(m)	<u>ه</u> د	,	~-	v	· •	•	, c	. <u>.</u>	.0	:	= v	•	~ -	-			Mostly nonsub	108	22 10 10 10 10
9	for subsidiaries and non- subsidiaries subsidiaries	6.12	100.00	20.cc	30	25.00	96	6.67	0.0	88	88	12.50	16.67	25.0	0.00	86		5.56	:	 	0.0	28.51	3	16.67		nout the same for subsidiaries and non- subsidiaries	6.72	11.70 5.44 10.34
Ohout th	for subsidia and non- subsidiaries	27		> ¬	• 0	· 65	o	o ~		-	•			→ €\		0	> <	-	•	~ ~		~	>		1	for subsidia and non- and non- subsidiaries	21	2 I 8 8 0
	Mostly subsidiaries	15.67	0.00	36	13.04	16.67	16.67	9.6	14.29	13.04	.0.	25.00	50.00	200	25.00	18.18	18.75	7.7	. ;	79.17 79.17	18.18	9.6	3	16.67		Mostly subsidiaries	15.67	10.38 14.89 12.93 31.03
	Mostly subsid	63	0	> c	> m	~	 •	o 8	•	w e	, 0	~	m e	4 C	•	~ 0	ه ه	n 00	•	× -	• 64	0 (>			Most 1	633	115°0
stination	Subsidiaries only	1.71	0.00	36	17,39	0.00	16.67	90	0.00	0.00 3.	20.0	12.50	8.6		6.25	18.18	11.8	22.22	:	- E	18.18	9.6	3	0.00	stination	Subsidiaries only	1.11	10 9.57 0.80 0.00 0.00
xport de	Subsi	ដូដ	0	>	· •	0	, ¢	00	0	۰ د	, ,	-	00	> C	~	~	ם מי	o 🗪	•	~ c	~	00	>	0	export de		311	10010
technology export destination	Frequency (total value)	402.00		۰,	23.0	21	(၃)	~ c	3~	53	- 6	- 00	بِی	10	16	=	- 0°	<u> </u>	;	27	:=	. .	-	9	technology export destination	Frequency (total value)	402.00	106 124 26 26
ions of	Number firms surveyed	831 831	י כא	~ 6	7 O S	9 2	19	ຕະ	;=	က တ ပ	S ==	2 2 2	တ ဇ	25 25	ຄຸຕ	23)	5 8	ļ	7:	72	7	5 2	11	Proportions of	Number firms surveyed	831	240 240 345 39 39
Proport	By type of industry	Firms responding Frequency (total value)/Lateral percent	(1)Agriculture, forestry, and fisher	(2)Mining (3)Construction	(4)Food processing	(5) Textiles	(6)Pulp and paper	(7)Printing and publishing (8)Swnthetic chemicals	(9) Oils, fats, and paints	(10)Pharmaceuticals	(12)Petroleum and coal products	(13) Plastic products	(1 4)Rubber products	(1 5) Iron and ctool	(17)Nonferrous metals	(18) Metal products	(1 9) Machinery	(2 1)Communications, electronics, and	electrical measuring instruments	(22)Automobiles	(24)Precision machinery	(25)Other industries	(26)Transportation, communications, ar	(2.7)Other types of industries	Propo	By scale of capital	Firms responding Frequency (total value)/Lateral percent	(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion (4) #50 to 100 billion (5) More than #100 billion

Rela	ative importance of Asia	in NIEs	Product develop					Str joi wit	Strongpoints for joint research with research	<u>د</u>
골드 s	Number Frequency firms (total surveyed value)	Not important as R&U strongpoints			R&O strongpoints for important technology	points ant	Basic research strongpoints	esearch uni oints fir	organizations, universities, and firms of Asian NIEs	and NIEs
831 831	806 902.00	576 71.46	239 29	3.65	15	1.86	-	0.87	82	3.47
2 2 2 C	≯ 2000	2 2 50.00 70 90.91 26 533.06	22 25.0	0000	00-00	000000	0000	00000		25.00
95 73 73				5 kč kč 5 kč kč	200	300 000	>-0	2.26 0.00		-0 m
25	13	54.	or-	270	-0	0.00	-04	0.00		20.5
8 8 8 8	5 5 5 6 6 7 7	2 2 2		.29	o ~	2.94 2.94	>	2.94		2.94
224	11.8	,		57.53	000	888	000	888		888
229	~ *	96.		- -	> c		,	888		
2 0 c	39 34 24		• 60 6~	:83		0.00 4.35	• • •	888		0.67
0000 140	76 78 78		31 36 3	8000	~40	1.61 4.76 0.00	080	030	⊶ ຕຕ	1.61 3.57 7.69
٦					0	0.00	0	0.00	0	9.0
	2 5 5 2 5 2	14 77.78	333		00	88	00		00	33.56
(2.5)Uther industries (2.6)Transportation communications, ar 2.6 nublic utilities	14 25		₹ 0		00		00	88	o	
11	18	9 52.94	3 17.	. 65	· 673	17.65	0	0.00	-	5.88
ative imp	importance of Asia	Asian NIEs						Str	Strongpoints f	ئ م
Number firms surveyed	Frequency (total value)	Not important as R&D strongpoints	Product develop- ment strongpoints (including pro- duction support)	lop- oints ro- ort)	R&D strongpoi for important technology	points ant	Basic resear strongpoints		with research organizations, universities, a firms of Asian	and n NIEs
831 831	806 902.00	576 71.46	239 29	.65	15	1.86	· -	0.87	88	3.47
308 199 45 39	2008 349 349 349	223 74.33 146 76.04 153 65.67 29 65.91 25 67.57	1 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	25.52 337.72 36.36 18.36	v0004	1.67 2.58 0.00 5.41	48-00	000 E04000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3.33 3.43 2.09 7.09

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	Contribution
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Question 12. Con	itributions	tributions made, research commissioned to universities overseas	orch comm	issioned to	univers	ities over	seas			,		
By type of industry	Number firms surveyed	Frequency (total value)	Nothing at all	ing 11	Less ¥1 m	Less than ¥1 million	#1 0	million more	₩ 5	million mare	¥18 of m	¥l0 million or more
Firms responding Frequency (total value)/Lateral percent	831 831	655 655.00	497 497	75.88	22	1.53	55	7.18	28 28 28	1.27	S 88	8.85
(1)Agriculture, forestry, and fisher (2)Mining		ب	₩.		00	0.00		0.00	0	0.00	•	0.00
(3)Construction	•	າ ຫ	51	86.44		000	C	33,33	-		۰ د	9.6
(4)Food processing	200	7	21	65.85	0	0.0		21.95	٠~	. 88	100	7.32
(5) Pulo and paper	~	27	 			5.55	٥.	0.0	(4.05	п.	9.03
(7) Printing and publishing	<u>,</u> ~	<u>.</u> ~	20	66.67	•		- C	• 1 · 0	>-	30.00	- 6	7.0
(8) Synthetic chemicals	29	67	35	71.43		2.04	· 67	6.12	٠~	4.08	۰,	14.29
(9) Uils, fats, and paints	=:	018	~:	9.00	٥.	0.0	~	20.00		10.00	0	0.00
(1 1)Other chemicals	2 C	35 26 26		58.73		2 4	→ ~	12.50	m c	0 4 0 0	on u	28.13
(12)Petroleum and coal products	2	91	:2	62.50	44	6.25	۰ د	12.50	4 64	12.50	-	6.25
(13) Plastic products	∝ '		12	92.31	0	0.00		7.69	0	0.00	0	0.00
(15)Ceramics	~	ۍ.	→ <u>0</u>	80.00 80.00		20.00	۰ د	000	00	9.0	۰.	0.0
(16) Iron and steel	າຕາ	21	2 2	000	•	38	-	70	> C			7.00
(1 7)Nonferrous metals	m	23	20	86.96	0	0.00	. 0	00.0		.35	•	4.35
(18) Wetal products	∾.	17	17	100.00	0	0.00	0	0.00	0	0.00		0.0
(I 9) Machinery	9	55	52	81.82	-	1.82	~	3.64	~	5.45	m	5.45
(2 1) Communications alectronics and	~ c		÷.	75.97	N C	 	∢ <	9.00	m (5.17	œ ¢	13.79
electrical measuring instruments	ż	3	3	5	>	3	>	3	7	0.0	2	10.00
(2 2)Automobiles	41	39	30	76.92	-	2.56	"	7.69	-	2.56	~	5. 13
(2 3)Other transport machinery		11	12	70.59	0	0.00	m		· 🗢	00.00	2	
(2 4)Precision machinery	24	22	~	59.09	0	0.00	က	13.64	~~	9.03	(M)	13.64
(2 5)Other industries		27	0		0	0.00	_	8.33	0	0.00		•
(2 6) Transportation, communications, an		21	11	80.95	0	0.0		4.76	~	4.76	2	
public utilities (2.7)Other types of industries	11	12	12	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Contributions made, research commissioned to universities overseas

By scale of capital	Contributions made, research commissioned to universities overseas	made, resea	arch comm	missioned t	o univer	sities ove	rseas					
	Number firms surveyed	Frequency (total value)	Not!	Nothing at all	Les:	Less than ¥1 million	*11 or 11	¥1 million or more	X+ 0	¥5 million or more	¥10 m	¥10 million or more
Firms responding Frequency (total value)/Lateral percent 8	31	655 655.00	497	75.88	22	1.53	77	7.18	28 28	4.27	5.88 8.88	8.85
(1)¥1 to 5 billion	80	235	228	97.02	2	0.85	67	1.28	-	0.43		0.43
(2)¥5 to 10 billion		153	127	83.01	~	1.31	13	8.50	9	3.92	'n	3.27
(3)¥10 to 50 billion		196	117	59.63	ڡ	3.06	5 6	13.27	~	7.14	29	14.80
(4)¥50 to 100 billion		-	o	24.32	0	0.0	~	5.41	S	13.51	91	43.24
(5) More than ¥100 billion		34	9	47.06	•	0.00	ო	8.82	~	5.88	•	20.59

Contributions made, research commissioned to universities overseas

¥100 million or more	15 15 2.29	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	00.00
Frequency (total value)	655 655.00	21213 0885122735536920934224934 212219 088512372553692093422494	12
Number firms surveyed	831 831	01000000000000000000000000000000000000	17
By type of industry	Firms responding Frequency (total value)/Lateral percent	(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmaceuticals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (14) Rubber products (14) Rubber products (15) Ceramics (15) Ceramics (15) Ceramics (16) Iron and steel (17) Nonferrous metals (18) Metal products (19) Metal products (19) Metal products (19) Metal products (20) Electrical measuring instruments (20) Electrical measuring instruments (21) Other transport machinery (22) Other industries (25) Other industries	(27)Other types of industries

Contributions made, research commissioned to universities overseas

¥100 million or more	2.29	13.00 13.01 13.51
¥ 6	15	00 ANP
Frequency (total d value)	655 655.00	235 1153 37 34
Number firms surveyed	831	308 199 240 45 39
By scale of capital	Firms responding Frequency (total value)/Lateral percent 831	(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion

Contributions made, research commissioned to universities in Japan

By type of industry	Number firms surveyed	Frequency (total value)	Noth at a	Nothing at all	Less ¥1 π	Less than ¥1 million	1 J#	million more	¥5 10	million more	¥10 m	¥10 million or more
Firms responding Frequency (total value)/Lateral percenf	831 831	783 783.00	185 185	23.63	95 95	12.13	183 183	23.37	က က တ တ	11.88	185 185	23.63
(1)Agriculture, forestry, and fisher	ĸ	. 🕶	•	25.00	•	25.00	0	0.00	-	25.00		25.00
(2)Mining		-	•	25.00	0	0.00	~	50.00		25.00	0	0.00
(3)Construction		16	•	23, 68	· G	7.89	21	27.63	v	6.58	23	30.26
(4) Food processing	20	97	12	26.09	-	8.70	တ	19.57	w	10.87	7	30.43
(5) lextiles	56	22	=	44.00	_	4.00	9	24.00	~	8.00	~	16.00
(6)Pulp and paper	19	15	-	46.67	0	0.00	~	26.67	~	13.33	~	13.33
(7)Printing and publishing	m	က	0	0.00	_	33.33	0	0.00	0	0.00	2	66.67
(8) Synthetic chemicals	29	58	11	29.31	S	8.62	∞	13.79	S	8.62	17	29.31
(9) Oils, fats, and paints	77		'n	45.45	7	18.18	~	18.18	0	0.00	82	18.18
(1 0) Pharmaceuticals	33	37	7	5.41	-	2.10		2.70	-	10.81	1	15.95
(1 1) Other chemicals	ري دي	30	S	16.67	~	6.67		26.67	6 7	10.00	=	36.67
(1 2) Petroleum and coal products	∞	11	~	11.78	~	11.76	~	11.76	m,	17.65	50 (47.05
(1 3) Plastic products	80		~	11.76	Ġ.	29.41	φ.	35.29	⊶.	20.00	m .	17.65
(1 4) Kuoper products	وم	٠,	~ •	33.33		16.67	- ;	16.67	→ L	20.0	- •	20.00
(1 6) Inch and atom	75	57.6	- 0	41.47 23.53	₹:	15.75	3	.4.40	o -	37.11	n c	70.04
(1 7) No. Access	50	÷.	•	50.00	⊒'	26.53	D (20.71	٦.	6.7	,	
(1) Nonterrous metals	200	S 6	2'	33.33	ഹ	16.67	ه ص	20.00	w) •	2.0	ه م	00.02
(1 0 Vmetal products	22	27	۰:	72.12	m (13.04	n ;	16.00	• ;	19-19	> :	20.0
(1 S) Machinery		200	=:	26.93	D	57.71	-	77.77	- <u>-</u>		3	- 0.0
(9 1)C		2 2	:	2) .) [25.11	52.	11.62	Ξ.	13.36	n •	00.47
(6 1) Communications, electronics, and alocations included and		n n	_	66.11	•	97.01	=	17.07	3	10.67	•	10.20
(9 9) But the measure of the commence of	٠	. ;	.;		. (•	,	•	•	•	;	;
(2 2)Other transport machiness	17	7	=	25.00	် တ (20.45	∞ •	18.18	1 0	11.36	<u></u>	25.00
(2.4.) Providion machinery	æ ;		.	22.22	 M	16.67	ه ص	33.33	m (16.67	(3.26
(9 E) Ather indicated	77	22	₹ '	27.78	N	9.03	*	36.36	2	50.5 50.5 50.5	۰ م	12.12
(2.6) Transportation communications	7.	7		21.43	·	21.43	~ (28.57	~	14.29	~	14.29
outlie stilities	N) 2	~	16.67		4.17	7	8.33	2	8. 33 23	2	41.6
(2.7.0ther types of industries	:					0	•	27			•	10 75
	.	9	o	31.63	-	67.0	•	31.30	ᆿ.	6.63	7	10.63
		: .										
****			. 4	,								
By scale of capital		LOULLONS MAGE, TESEBICH COMMISSIONED LO UNIVENSILLES IN JAPAN		namorsst		TIES TH	ueden Pden					
	Number firms	Frequency (total	¥9 ₹9	pur	Less	Less than	¥1	¥1 million	¥.	¥5 million	¥10 m	¥10 million
	surveyed	value)	at all	11,	¥1 m	illion	10 II	more	P	тоге	OF MOFE	ā

23.63

18.56 15.43 4.80 2.44 0.00

39.86 25.53 8.30 6.88

308 199 240 39 39

(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion

95 95 11 11 11 11

23.63

783 783.00

831 831

Firms responding Frequency (total value)/Lateral percent

23.37

Contributions made, research commissioned to universities in Japan

Firms responding Frequency (total value)/Lateral percent 831 (1) Agriculture, forestry, and fisher 5 (2) Mining (3) Construction (4) Food processing (5) Textiles (5) Pub and paper (7) Printing and publishing (8) Synthetic chemicals (8) Synthetic chemicals (10) Pharmaceuticals (10) Pharmaceuticals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (14) Rubber products (14) Rubber products (15) Pastic products (16) Pharmaceuticals (17) Pharmaceuticals (18) Pharmaceuticals (18) Phastic products (18) Pharmaceuticals (18) Pharmaceuticals (19) Pharmaceuticals	ET LAGU RUBBUL BB LAGURBUL BB AARRINGS TEOLI BB	2 00 0 4 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
Agriculture, forestry, and Mining Construction Food processing Fertiles Friting and publishing Printing and publishing Synthetic chemicals Pharmaceuticals Pharmaceuticals Pharmaceuticals Petroleum and coal products Rubber products			
Construction Food processing Fulp and paper Printing and pub Nyithetic chemicals Olls, fats, and Other chemicals Petroleum and con Plastic products Constructs Constr			
Food processing Fulp and paper Printing and pub Northetic chemic Olls, fats, and Pharmaccuticals Other chemicals Petroleum and con Plastic products			
Printiles Printing and paper Printing and pub Synthetic chemic Oils, fats, and Pharmaceuticals Other chemicals Pretroleum and co Plastic products Chaber products			
Printing and paper (Synthetic chemic) 1011s, fats, and (Pharmaceuticals) 10ther chemicals Petroleum and co (Plastic products)	1404mm		
Frinting and pub Synthetic chemic Jolis, fats, and Pharmaceuticals Other chemicals Petroleum and co Plastic products Prober products			
) yournetic chemic 101s, fats, and 10ther chemicals 10ther chemicals Petroleum and co) Plastic products			
Pharmaceuticals Other acceuticals Other chemicals Petroleum and co Plastic products Rubber products	17971		
1.10 The market of the state of	-0-1		
10 D) (~ (*		
70.0		00.0	
-		> · · ·	
(1 5) (2000)	.	0.00	
25 STEEL CHITCE	53		
(16) Iron and steel		•	
(i 7)Nonferrous metals 30		•	
(18)Metal products	22	0.00	
		~	
inery and appliance			
ons, electronics, and		٥	
electrical measuring instruments			
(22)Automobiles	77	0.00	
က		1 5.56	
(2 4) Precision machinery	22	0.0	
ŝ		0.00	
(26) Transportation, communications, ar 26	72	5 20.83	
public utiliti	•		
(27)Uther types of industries 17	16	0.00	

Contributions made, research commissioned to universities in Japan

	TIEDER IIT				
By scale of capital	Number firms surveyed	Frequency (total value)	¥100 m	¥100 million or more	
Firms responding Frequency (total value)/Lateral percent	831 ent 831	783 783.00	22	5.36	
(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion (4) #50 to 100 billion	80044 80044	2188 2288 1288 1288	m 2 9 F 3	1.03 1.06 17.07	
(3/ More than #100 Dillion	ממ	•	:	01.15	

Ouestion 14.	timate image	o	international	expansion	of R&D				It does	ccordina		
By type of industry	Number firms surveyed	Frequency (total value)	R&D strongpo in Japan, th and Europe w originality	ints e U.S iith	Core R&D functin Japan and supplemental functions over	tions only R&D rseas	Core R&D fin Japan, aim for co	unctions but to imposite pansion	to affilia companies clients; n	Affiliated mpanies and ients; not image independence	Do not inte to inter- nationally expand R&D	intend er- ally R&D
Firms responding Frequency (total value)/Lateral percent	831 831	800 800.00	76	9.50	191 191	23.88	168 168	21.00	09 80	7.50	274	34.25
(1) Marianthura forestructus	N	~	•	6	c	6	-	26	-	00	c	
(1) my rearch e, lorescry, and table: (2) Mining (3) Construction	o -4 €	- - €	>	25.00	> ⊶ t̄	25.00	c	25.00	-00	0.00	4 → ç	
(4) Food processing	20	25	o vo -	10.64	16	34.04	~ 6 0	12.77	o	2.13	2 eo	
(5) extiles (6)Pulp and paper	26 19	2 22		- - - - - - - - - - - - - - - - - - -	v 6	20.00 10.53	ıo 🗻	20.00 21.05		4.00 5.26	2:	
(7)Printing and publishing (8)Synthetic chemicals	, m		07	0.00	5	33.33	· œ	33.33		33.33	:0;	
(9) Dils, fats, and paints	3-18	80 %	, t	11.11		33.33	5	11.11	.0-	0.00	; - ~	4.
(11)Other chemicals		38	· •~ «	20.00		14.29	: ::::	37.14	· en c	8.57	· 🛶 :	
(12) Petroleum and coal products (13) Plastic products	20 00 	18	- m	16.67	⊅ ₹	35.29 22.22	7	5.56	7 C)	11.76	۰ - م	
(1 4)Rubber products (1 5)Ceramics	9 22	9 F	0 N	6.00 6.45	⊶ ••	16.67 25.81	ကဖ	50.00 19.35	o	9.00 3.23	~ =	
(16) Iron and steel	88	~ c		2.94	~~	11.76	w &	14.7	. ← R.	20.59		
(18) Metal products	23	23.5	r (4)	22.8		17.39) en (13.05	o en (13.04	22	
(1 9)Machinery (2 0)Electrical machinery and appliance	8	6 3	9 0	9.52 12.20	9 61	25.40 23.17	- - - - -	22.22 25.61	ოთ	4.76 10.98	23 23	
(2 1) Communications, electronics, and electrical measuring instruments	39	39	~	10.26	on .	23.08	=	35.90	0	0.00	12	•
(22)Automobiles	L 7	S.	₩.	•	15	33.33	17		80	•	 -	vi o
(2.4)Precision machinery	2 7	73 g	7 67	8.70	4 CD ·	26.09	n en (39.13) •	35.35	- vo e	21.74
<pre>(2 3)Uther industries (2 6)Transportation, communications, ar</pre>	7 26	7.02			~ ~	28.57 10.00	∽	-0	-0		7 21	÷
public utilities (2 7)Other types of industries	11	11	6	17.65	-	41.18	2	11.76	0	0.00	~	23.53
UL	imate	image of inter	nal	expansion	of R&D				It does	secordina		
By scale of capital	Number firms surveyed	Frequency (total value)	R&D stro in Japar and Euro original	R&D strongpoints in Japan, the U.S. and Europe with originality	Core R&D in Japan supplemen functions	tions only R&D rseas	Core R&D fin Japan, aim for co	unctions but to mposite pansion	to affiliated companies and clients; not im	affiliated mpanies and ients; not image independence	Do not inte to inter- nationally expand R&D	Do not intend to inter- nationally expand R&D
Firms responding Frequency (total value)/Lateral percent	831	800.00	76 76	9.50	191 191	23.88	168 168	21.00	009	7.50	274	34.25
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	308 240 395 395	2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	212 218 5	8.05 9.57 9.05 13.16	84584	17.79 28.72 31.03 10.53	32 22 14 14 14	10.74 15.96 30.17 50.00	51000	2.00.00 0.00 0.00 0.00	137 71 50 6	45.97 37.77 21.55 13.64 26.32

V. State of Globalization of R&O Strongpoints in Japan Question 2.

Ouestion 2. Futu	ire target	percentages of	of non-	non-Japanese researchers at	esearcher	R&O	strongpoi	strongpoints in Japan	<u> </u>			
By type of industry	Number firms	Frequency (total		į	;	;	;		;	;	;	
	surveyed			20	€	About 1%	ē	About 2%	About	ut 4%	æ	About 6%
Firms responding Frequency (total value)/Lateral percent	831 831	765 765.00	161	21.05	97	6.01	38	7.7	21	2.75	16 16	2.09
(1) Agriculture, forestry, and fisher	ĸ)	63 .	0	0.00	-	33,33	-	33.33	0	0.00	0	0.00
(2) Construction	7	→ [-:	25.00	0	0.00	0	0.00	0	0.00	0	0.0
(4) Food processing	2 C		23	20.78	~ 0	2.60	cı .	2.60	- (1.30	က	3.90
(5) Textiles	5 2	25.5	-	28.00	o –	70.0	c	77.78	-	8 6 7	«	2.21
(6) Pulp and paper	19	12	-	26.67	-	26.67	• 0	35	c	-	> c	36
(7)Printing and publishing	es (w.F		33.33	.0	0.00	•	0.0	,	33.33	0	0.0
(O) O) STREET CHEMICALS	79.	o •	n e	90.0	❤.	7.27		1.82		1.82	0	0.0
(10)Pharmaceuticals	CC) (F	~ ~	30.00	v	10.00	-	9.6	c	10.00	0	9.0
(11)Other chemicals	, es	, w	۱	20.00		25.00	> e-	, «	> -	0.00 8.00	> c	0.0
(12) Petroleum and coal products	œ	16	۰ 64	12.50	, w	18.75	. 0	00.0	- 0	00.0	>	36
(13) Plastic products	<u>~</u>	11	•	23.53	-	5.88		5.88	0	88	•	0.0
(1.5)[eramics	۵.	٠ د	0:	0.0	0	88	-	0.0	0	0.00		20.00
(16) Iron and steel	9 Y E	n e:	==	10.28	>	90.0	m ¢	10.34	-	0.00	٥.	0.00
(17) Nonferrous metals	88	9 50	, w	17.24	د	3.45	4	9.0	> <	900	c	3.03
(18)Metal products		21	-	19.05	•	4.76	•	0.0	• •		4 C	96
(19) Machinery		29	11	27.42	_	1.61	S	8.06	·	8,06	~	300
(2))Communications of other ind		9.4	='	14.47	~ (5.26	~	2.63	ĸ	6.58	7	2.63
electrical measuring instruments	•	5	2	9.11	*5	8.1	-	10.81		2.10	က	8.11
(22)Automobiles	27	27	7	15.56	-	2 22	•	77 7		•	•	
(23)Other transport machinery	<u>~</u>	9	- ~	12.50		6.25	۰.	6.75	~ ⊂	, c	⊸	27.7
(2 4) Precision machinery	74	22	~	9.09	~~	9.0	•	4.55	> ~	900	>	36
:	7	7	~	14.29	~	14.29	es	21.43	0	9	• •	000
(20/Fransportation, communications, ar	56	23	2	43.48	0	0.00	0	0.00	0	9	•	9
(2 7)Other types of industries	11	7	~	28.57	0	0.00	0	0.00	-	7.14	0	0.00
Future	target	percentages	of non-J	non-Japanese res	researchers	at R&O st	rongpoin	strongpoints in Japan				
By scale of capital	Number	Frequency					i	-				
	ricms	(total value)	70	**	About	ıt 12	About	t 2%	About	4%	About	t 62
Firms responding Frequency (total value)/Lateral percent	831 831	765 765.00	161 161	21.05	99		35	77.7	22		16 16	
(1) ¥1 +c 5 h:11;c.	900	281	ð	37 66	:	63 7	•	•		•	•	;
(2) ¥5 to 10 billion (3) ¥10 to 80 billion (4) ¥50 to 100 billion	240 440 50 50 50	7 7 2 3 3 3 7 3 3 3 3 3 3 3 3 3 3 3 3 3	* ~ ~ ~ .	25.08 27.08 27.36	3-20	10.09	9 L B W		4N Q M		m → ∞ ~	2.13 3.67 2.27
(3) More than #166 billion	מי	÷	٥	17.63	~	5.83	~	 		2.94		0. 0

Future target percentages of non-Japanese researchers at R&D strongpoints in Japan

By type of industry	Number firms surveyed	Frequency (total value)	Арог	About 8%	Abo	About 10%	æ	About 15%	20% or	higher	No tar	No target set
Firms responding Frequency (total value)/Lateral percent	831	765 765.00	~ ~	0.26	11	2.22		9.13	~~	0.26	465	80.18
				;	,	;	,	•	•		•	
(1) Hgriculture, forestry, and fisher	S	m	0	0.00	0	0.00	0	0.00	•	0.00	(32.23
bututw(2)	-	-	0	0.0	0	0.0	0	0.00	0	0.00	د.	15.00
(3)Construction	82	11	0	0.00	_	5.19	0	0.0	0	0.00	\$	63.64
(4)Food processing	0	77	0	0.00		2.27	0	0.00	0	0.0	~	54.55
(5) Textiles	26	25	0	0.00	0	0.00	0	0.00	0	0.00	Ξ	56.00
(6) Pulp and paper	6	22	0	0.00	0	0.00	0	0.00	0	0	~	46.67
(7)Printing and publishing	•	e-2	0	0.00	0	0.00	0	0.00	0	0.00		33.33
(8) Synthetic chemicals	62	55	-	1.82		1.82	0	0.00	0	0.0	2	76.36
(9)Oils, fats, and paints		2	0	0.00	0	0.00	0	0.00	0	0.0	S	20.00
(10)Pharmaceuticals	œ.	35	0	0.00	0	00.0	0	0.00	0	0.00	28	80.00
(11)Other chemicals	35	35	0	0.00	0	0.00		0.00	-	2.86	2	57.14
(12)Petroleum and coal products	18	16	0	0.00	0	0.00	0	0.00		9.0	=	68.75
(13)Plastic products	8	-	0	0.00		5.88	0	0.0	0	0.00	2	58.82
(1 4)Rubber products	မှ	S	0	0.0	0	0.00	0	0.00	0	8	• ;	80.00
(15)Ceramics	32	62	_	3.45	0	0.0	0	0.00	0	6.6		37.93
(16) Iron and steel	36	33	0	0.00	, ,	3.03	0	0.00	0	0.00	~	39.39
(17)Nonferrous metals		67	0	9.0	-	3.45	0	0.00	0	0.00	20	58.97
(18)Metal products		12		0.00	0	0.0		4.76	0	8	2	71.43
(19) Machinery		29	0	0.00		1.61	0	0.00	0	0.00	<u></u>	50.00
(20) Electrical machinery and appliance		16	0	0.0		1.32	•	0.00	0	0.00	<u>.</u>	67.11
(2 1)Communications, electronics, and		37	0	0.0	~	2.4∃	0	0.00	9	3	12	36. fb
electrical measuring instruments						•		,	,	•	ć	***
(2 2)Automobiles	11	45	0	0.00	0	0.00	0	0.00	.	9.6		22.22
(2 3)Other transport machinery	8 2	91	0	0.00		6.25	0	0.00		6. 25	2:	62.30
(2 4) Precision machinery	7.7	22	0	0.00	~	9.09	-	0.00	0	0.00	<u>~</u>	29.03
(25)Other industries	*	7	0	0.0	0	0.00	0	0.00	0	0.00	~ :	20.00
(26) Transportation, communications, ar	56	23	0	0.0	•	0.00	•	0.00	0	0.00	13	26.32
public utilities	•	•	•	•	•	;	<	6	c	00.0	œ	57,14
(2 (Jurner types of industries	=	-	-	3.	-	1.14	>	5	•	:	•	

Future target percentages of non-Japanese researchers at R&D strongpoints in Japan

	חוב רפו אבר	per certages or		ישוובאב ויי	פפו רוועו	מני אמני		oden sit eniit	=			
By scale of capital	Number firms surveyed	Frequency (total value)	About	8	Abou	ıt 18%	€	out 15%	20% or higher	nigher	No targe	t set
Firms responding Frequency (total value)/Lateral percent	831 831	765 765.00	7 7	0.26	111	2.22		0.13		0.26	465 60.78	60.78
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥60 to 100 billion (5) More than ¥100 billion	2 1 3 0 3 8 8 8 9 8 8 8 9 9 8 8 9 9 8 8 9 9 9 8 9	308 281 1 0.36 3 1.07 0 0.00 199 188 0 0.00 5 2.66 0 0.00 240 218 1 0.46 7 3.21 1 0.46 45 44 0 0.00 1 2.27 0 0.00 39 34 0 0.00 1 2.94 0 0.00		0.000.000.0000.000000000000000000000000	ww	2.21 2.21 2.21	00~00	00000	-0-00	0.00	123 133 20 20 20 20 20 20 20 20 20 20 20 20 20	54.45 65.43 62.84 68.18 64.71

Question 4.	isons for e	Reasons for employing non-Japanese researchers	-Japanese	researche	8				L			
industry	Number firms surveyed	Frequency (total value)	To develop technology is touched by differen concepts	To develop new technology that is touched off by differences in concepts	C #	o globalize esearch anagement	To shore lack of t personnel	To shore up the lack of talented personnel	expectations superb research that cannot be expected from Japanese researchers	Expectations from superb researchers that cannot be expected from Japanese	To build the foundation for setting up overseas in the future	To build the foundation for setting up overseas in the futing
Firms responding Frequency (total value)/Lateral percent	831 4 831	161 248.00	21	31.68	, z	27.33		39.75	30	18.63		12.42
(1) Baricultura forestru (1)		•	•	•	•	•	•				¦ '	
(1) Mining			50	800	> 0	9.00		99	-	9.6	00	9.0
(3)Construction	20	18	· 6 3	45.45	~	18.18	•	36.38	•	36.36	» e4	
(4)rood processing (5)Textiles	200	2	€	12.50		12.50	es c	37.50	00	9.0	6	12.50
(6) Pulp and paper	9 6 I	~	•	.00		38	> ~	20.00		96	90	000
(7) Printing and publishing	es (٥,	٥.	6.0	٥.	8.6	٥.	0.0	0	0	0	0.00
(9)0ils. fats. and paints	2 - 2 -	12		- 0	→ c	28.27	~ c	28.57	~ C	14.29	es c	21.43
(10) Pharmaceuticals	38	17	S	50.00	· ~	30.00		20.00	-	60.00	> —	20.0
(11) Other chemicals	S.	ខ្ព		12.50	~	25.00	~	25.00	~	25.00		12.50
1. L/Fetfoleum and coal products (1.3)Plactic products		mc		20.00	c	20.00	 <	20.00	0	8 6 6	0	9.6
(14) Rubber products	- w	•	•	80.0	•	900	>	99	-	38	>	000
(15)Ceramics	8	w ć	(25.00	00	9.0	***	50.00	0	0.00		0.00
(1 7) Nonferrous metals	2 6	2:	, c	33.00	~ 6	33.33	P9 C	50.00	~	33.33	0	0.0
(18)Metal products	88	30	10	10.0	۰,	9.00	n	90	>0	38	-0	90
(19) Machinery		19	••	21.43	m	21.43	6	42.86	.	28.57	0	0.00
(2 0) Electrical machinery and appliance		97	21	41.38	on ·	31.03	2	34.48	Ţ	13.79	_	24.14
ot illommunications, electronics, and placements		97	n	31.25	•	25.00	٥	37.50	m	18.75	~	18.75
(2 2) Automobiles	4	13	~	57,14	44	42.86		78.57	6	78 57	-	11 20
(2 3)Other transport machinery	8	.	~	40.00	~~	60.00	~	60.00	•	20.00	. 6	9.0
(2 4)Frecision machinery	Z :	 	es -	30.00	~ (6 0.00	ω.	80°63		10.00	.0	0.00
(2 6) Transportation, communications, and	- N	2 64		100.00	>	100.00	C	0.00	> c		⊂	90.0
•		ì	1		•		•	:	•	:	•	:
(2 7)Other types of industries		က	0	0.00	-	50.00	0	0.00	_	20.00	0	9. 00.
Reason	s for	employing non-	Japanese	non-Japanese researchers					Functations from			
			To develop new	p new					superb researchers	earchers	To build the	1 the
By scale of capital			is touched off	y that d off	To globalize	lize	To shore up the		that cannot be expected from	t be rom	foundation for setting	ion ing
	surveyed	value)	by differ concepts	ences In	research		lack of ta personnel		Japanese researchers	m	up overs	overseas the future
Firms responding Frequency (total value)/Lateral percent	831 831	161 248.00	51	31.68	=	27.33	3	39.75	30	18.63	20	12.42
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	8 8 9 9 4 8 8	23 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	~~ % ~~	11.86 33.34 36.84 56.75	လထင္ဆာထာတ	17.86 20.69 27.54 42.11 37.50	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	46.43 62.07 34.78 6.25	~~ _ ~~	7.14 20.34 15.79 50.00	N40N0	17.86 13.79 8.70 0.00
			ı					,			ı	•

researchers	
non-Japanese	•
or employing	
Reasons fo	

Keasc	keasons ror emp	employing non-Japanese research It is a company	apanese re It is a c	ompany"			
By type of industry	Number firms surveyed	Frequency (total value)	is also being followed in the research depart.	eing in the depart.	Other		
Firms responding Frequency (total value)/Lateral percent	831 831	161 248.00	22	13.66	11	10.56	
(1)Agriculture, forestry, and fisher	50 4	00		0.00	00	0.00	
	- Z	180		00.0		9.03	
(4)Food processing	50 25	50		22.00 0.00	N 0	25.00 0.00	
	61	. 00		9.6	~ C	50.00	
(1)Printing and publishing (8)Synthetic chemicals	233	21		21.43	.	28.57	
(9)Oils, fats, and paints	 200 200 	11	 	0.00	o	10.00	
Other chemicals	က က ထ	2"		12.50 0.00	0	12.50 0.00	
<pre>(1 3)Plastic products (1 3)Plastic products</pre>	250			80.0	00	90	
(14)Rubber products (15)Ceramics	35 36	s vo		25.00) ~4 (25.00	
	98	01:		99	00	96	
	23.5	20		0.0	0	8	
6	64	91		7.14	N -	14.29	
(20)Electrical machinery and appliance (21)Communications. electronics, and	→ 01	5 0		18.75	- 82	12.50	
electrical meas	; !			•	•	6	
3	~ 0	m oc ⊶	- 0	0.00	> ~	20.00	
(23)Uther transport machinery (24)Precision machinery	25	. 85	•	4 0.00	0	0.00	
3	14	es (-	86	0 0	88	
(26) Transportation, communications, ar	92	,	>	3	>		
(2 %)Other types of industries	17	က		20.00	0	9	
	ons for em	Reasons for employing non-Japanese researchers - company- mide nolicy that	Japanese r It is a (researchers company- icy that			
By scale of capital	Number firms surveyed	Frequency (total value)	is also being followed in the research depart.	sing in the depart.	Other.		
Firms responding Frequency (total value)/Lateral percent	831 831	161 248.00	22	13.66	11	10.56	
(1)¥1 to 5 billion (2)¥5 to 10 billion	308 199	999	w es	17.86	เก⊷ด	3.45	
(3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	245 39 39	105 34 29		10.53 6.25	014	5.26 12.50	

Question 5.	oblems enc	Problems encountered in employing non-Japanese researchers	employing	non-Japa	nese re	searchers						
By type of industry	Number firms surveyed	Frequency (total value)	Education children	ition of Iren	Secu For	Securing a place of work for spouses	Acqu. Work	Acquiring a work visa	Secu	Securing housing	Lang	Language problems
Firms responding Frequency (total value)/Lateral percent	831	161 309.00	60	5.59	∞	4.97	28	17.39	52	15.53	29	38.51
(1)Agriculture, forestry, and fisher		•	c		c	6	c	6	c	6	٠	ç
(2)Mining	•	• •	, 0	30	>	98	•	36	> 0	900	> 0	38
(3)Construction	20	21	• 673	23.08	-	7.69	~	15.38	o e-:	23.08	e ca	46.15
(4) Food processing	20	12	0	0.0	0	00.0	•	16.67		16.67	• 673	50.00
(5) lextiles	92	0	0	0.0	0	0.00	0	0.00	•	0.00	0	0.0
(b) rulp and paper	5 .0	ro (0	0.0	0	0.30	0	0.00	0	0.00		50.00
(*) Trinting and publishing		~ 6	-	8:	٥.	0.0	(100.00	٥.	0.0	01	9.0
(9)0ils fate and nainte	2 -	9 ~	→ -	70.0	~ €	- 0	~ <	14.29	c	7.	~ <	50.00
(10) Pharmaceuticals	- e-3			3-	-	36	>	36	-	3.00	> ~	33.00
(11)Other chemicals	35	11	. 0	0.0	0	000	· ~	33,33	,	11.15	3 67	36.
(1 2) Petroleum and coal products	~	ς.	•	0.00	0	0.0		50.00	. 0	0.00	•	20.00
(13) Plastic products	<u>~</u>	0	0	0.0	0	0.00	0	0.00	0	0.00	0	0.0
(1 4)Kubber products	ي م	01	0		٥.	9.00	٥.	8.6	0	0.00	0	0.00
(16) Iron and steel	72	- a	> c	96	- •	25.00	-	96	-	0.0	~ €	22.00
(17)Nonferrous metals	9 6	20	•	9 6	.	30.00	> ¢	30.00	> •	30.00	~	25.25
(18)Metal products	2	; =	• •		° C	55.50	, c	27.77	4 C	77.77	,	; e
(1 9) Machinery		72	•	0.00	•	00.0	~	15.38	~	38.00	> ~	30, 77
(2 0) Electrical machinery and appliance		67	~	3.45	~~	6.90	-	13.79	~	6.90	· თ	31.03
(6 illommunications, electronics, and	33	35		6.67	0	0.00	w	33.33	m	20.00	_	46.67
(* A)Antended measuring instruments		;		;	,	,		,		!		1
(2.3)Other transport machinery	~ ≃	~ °	⊶ €	14.29	0	8.6	⊷ <	14.29	~ €	57.14	φ.	85.71
(2 4) Precision machinery	25.2	92		35	> <	30	> ¬	35.35	~		- ~	00.07
(25)Other industries	=	, m	• •	900	•	000	, c	000	- 6	60.0	· 	20.05
(26) Transportation, communications, ar	3 6	•••	0	0.0	0	0.00	•	8		0.00	ح.	9.0
public utilities	;	,										
(<i>t il</i> uther types of industries	11	~	•	0.0	0	9.0	0	0.00	•	0.00	0	0.00
P	Problems enc	encountered in e	employing	employing non-Japanese	nese re	researchers						
	Number	Frequency	Educa	4:00	Secu	ring a	•		•	,	,	
by scale of capital	surveyed	(total	children	Len	For F	piace of work for spouses	₹ 5-5	Hcquiring a work visa	Securin	Securing housing	Lang	Language problems
Firms responding	831	161					9	•	č			
ון בלחבוורא ווחופד אסדתביי דפובו פד אבו רבווו	720	203.600	מ	9.03	10	7.	97	£5.71	S	15.53	29	38.31
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion	308 199 240	57 133	~ ~~	6.90 5.80 80		3.45	മസത	31.03 17.86 11.59	≁ 00	13.79 7.14 11.59	11 29 29	37.93 35.71 42.03
(4) $\%50$ to 100 billion (5) More than $\%100$ billion	2 & & & & & & & & & & & & & & & & & & &	25 29		5.00	64		70	20.00 13.33	ωw	30.00 33.33	∞ →	40.00 26.67

Proble	22	encountered in emp	loying non-Japa	employing non-Japanese researchers	e researd	hers						
By type of industry	Number firms surveyed	Frequency (total value)	rroblems will customs and religious beliefs	sand suspine	Employment conditions (high wages, etc.)	nt con- (high tc. j	High t	High turnover	Difficu accessi lent re	Difficulties in accessing excel- lent researchers	Differences in research style	nces
Firms responding Frequency (total value)/Lateral percent	831 831	161 309.00	92	16.15	20	12.42	20	12.42	34	21.12	30	18.63
(1) Agriculture, forestry, and fisher	s	0	0	0.00	0	0.00	0	0.00	0	0.00	00	0.00
(Z)Mining	~;	0	٥.	86	0	9.9	-	96	-	10.00	5 ~	7.00
(3) construction (4) Food processing	2) C 30 V	12	⊸ c	20.0	> ~	50.00	,		, 0	0.0	- 2	33.33
(5) Textiles	5 2	10	• •	.0	,0	99.	• •	9.0	0	0.0	0	0.0
(6)Pulp and paper	6.	67	0	0.00	0	9.0	0	8.6	⊶.	20.00	 •	80.00 0.00
(1)Printing and publishing (8)Sunthetic chemicals	~ £	~ ∝	o-	9.00		9.6	o	0.00	m	21.43	> e>	14.29
(9)0ils, fats, and paints	3	300	٠ بـــا ،	100.00	•	8	0	0.0	•	8.0	 -	100.00
(1 0)Pharmaceuticals (1 1)Other chemicals	60 KJ		-	33,33	N 0	22.22 0.00	5 ~	0.00 22.22	~ ~	11.11	-0	9.6
(12) Petroleum and coal products	3 œ	'n) -1	20.00	0	00.00	0	0.0		20.00		50.00
(13) Plastic products	<u> </u>	00	00	8 6 0 0	00	000	<u>-</u>	88		900	-	0.0
(15)Ceranics	33	> ~	· ~	50.00		25.00	. 0	8	•	0.0	0	0.0
(16) Iron and steel	9	· co	~	33.33	C	16.67	•	9:		16.67	0 4	00-07
(1 //Nonferrous metals (1 8)Wetal products	23	5 a	>	900	.	88	· •	0.00	-0	0.0	, • •	0
(1 9) Machinery		72	, 	1.69	.	30.77	~	15.38	67)	23.08	~	15.38
(2 0) Electrical machinery and appliance		9,1	→ (13.79	-	13.79 6.79	- v	13.79	~	26.90	20 60	13.33
16 1/communications, electronics, and electrical measuring instruments	ŝ	2	•		•		.		•			11
(2 2) Automobiles	-	14	0	0.00		14.29	.	8.6	m -	98.27	,	14.29
(2 3)Other transport machinery	18 77	**	- ~	18.18	es	20.00	- ~	27.27	e->	27.21	· ·	36.36
	=	m	1 () ()	0.0	0	0.00	0	88		89.89	00	000
(26) Transportation, communications, and	9 2	-	-	0.0	-	3.5	.	5.5	· ·		• •	
(2 7)Other types of industries	11	~	0	0.0	0 · · · · · · · · · · · · · · · · · · ·	0.00	-	0.00	-	20.00	•	S .
Proble	lems encountered	Ę.	loying n	employing non-Japanese researchers	se resear	chers						٠,
By scale of capital	Number firms surveyed	Frequency (total value)	Problems wi customs and religious beliefs	Problems with customs and religious	Employment conditions (high wades, etc.)	nt con- (high tc.)	High t	High turnover	Difficu accessi lent re	Difficulties in accessing excel- lent researchers	Differences in research style	ences earch
Firms responding Frequency (total value)/Lateral percent		161 309.00	56	16.15	2	12.42	50	12.42	35	21.12	30	18.63
(1) #1 to 5 billion (2) #5 to 10 billion (3) #10 to 50 billion (4) #50 to 100 billion	308 199 45	1388 1388 1238	0 4 0 4	20.59 14.29 13.04 20.00	ผผฐพ	6.90 7.14 14.49 10.00	-027	3.45 7.14 17.39 20.00	664	20.69 20.29 30.00	<u>രരന്</u> പം	20.69 21.43 18.84 15.00
(5) More than ¥100 billion	39	53	~	20.00	~	26.67		6.67	n	33.33	7	13.33

Why R&D strongpoints in Japan carry out joint research with overseas firms

Question 7.

Number Frequency to do joint re firms (total search with surveyed value) overseas firms	Firms responding 831 247 Frequency (total value)/Lateral percent 831 342.00 23	0		o	37 96	19 2	7)Printing and publishing 3 3 0	62 32 1	11 7 1	38 42 2	es :	C			16 3	12	23	9. 9. 9.	10	24	47 19 0	2 3)Other transport machinery 18 7 0	24 8 1	14 6	26) Fransportation, communications, ar 26 12 1	(27)Other types of industries 17 7 1	
difficult ese firms that hav-It joint re- ind creative philo-fr with sophy, distinctive tiss firms technology	9.31 116 46	•	G	o	25.00 2 50	·.—	~	=	~	0	٠ دي	÷	66.67 2 66	. ~	w	S)	⊶ (20 4	C ~	• ,	65	0.00 2 40	••	0	ယ	20.00 2 40	
Japan— at hav—It is a foothold philo—for our company's nctive future globaliza— tion	46.96 54 21.86	0.00 0 0.00	> ¢	3 67	•	0	0,	-	~	en j	~	>-	66.67 1 33.33	~	Α.	 • •		00.02	- «	•	29 4 28.57	40.00 1 20.00	0	 		0.00 0 0.00	
d 's In order to draw a- up common product standards	14 5.67	0.0			0.00	0.00	0 0 0	1 . 55	16.67	3.70	200		0.00	0 0 0	10.00	0.00	300	00.00	00.0		0 0 0	0.00	0.00		2 20.00	2 40.00	
To share in development of new products	108 43.72	0.00		20.01	2 50.00	1 : 100.00			00.00		•	00.05	0.00	70.00	00.07	0.00	28.88	11 20.00	7 77.78		5 35.71	3 60.00	3 42.86	2 66.67	0.00	2 40.00	

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By scale of capital	Number firms	Frequency (total	It is d to do j search	It is difficult to do joint re- search with		<pre>lhere are no Japan- ese firms that hav- It is a foothold ing creative philo- for our company's In order to draw sophy, distinctive future globaliza- up common product</pre>	It is a for our future g	foothold company's lobaliza-	In order up commo	to draw		in ent of
		Value	oversea	S TITIES		3 6	tion		standaro	<u>s</u>	new products	ucts
Firms responding Frequency (total value)/Lateral percent	8831	247 342.00	23	9.31	116	96.98	35	21.86	Z .	5.67	108	43.12
(1)¥1 to 5 billion	308	79	m.	6.00	13	26.00		22.00	و ود	10.00	70	48.00
(2) ¥5 to 10 billion	.188	20	7	5.56	13	36.11	2 ;	21.13	y -		ب پور	20.00
(3)¥10 to 50 billion	240	148	<u> </u>	13.33	6	46.67	5 2	23.81	₹(2.81	٥	63.01
(4)¥50 to 100 billion	S	42		3.33	72	80.00	S.	16.67	0	2	י ת	30.00
(5) More than ¥100 billion	39	38	~	11.54	11	65.38	m	11.54	~	11.54	מכ	34.62

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	Even from a worldwide view, firms do not need such labs	2.89	2.95 2.95 2.95 2.95 2.95 2.95 2.95 2.95	0.00 0.00 0.00 0.00 0.00	from a wide view, do not such labs	2.89	3.41 1.04 5.61 5.55 5.56
	Even from a the worldwide vi firms do not need such la	233	00000-040-000-0-0-0-	00000 0	Even hworld firms	233	0 2 2 2 2 2 2
	Bringing such a lab into existence E in Japan's research w climate would be f difficult	9.42	33.33.33.33.33.33.33.33.33.33.33.33.33.	6.82 16.67 8.70 7.14 8.33	Bringing such a lab into existence in Japan's research climate would be difficult	9.45	8.19 9.90 13.43 5.56
	Bringing such a lab into exist in Japan's rest climate would l	តត	⊙ ~6048040~400~400		Bringir lab ind in Japa climate	55	248 408
Labs	recog- r such ompany nk of up	19.27	100.00 66.67 82.98 82.98 66.67 100.00 73.68 71.43 83.33 82.14 72.41 86.96 87.50 87.50	86.36 61.11 86.96 71.43 83.33	as Bell Labs Although we recog- nize need for such a lab, our company does not think of setting one up	19.27	78.16 80.73 73.33 71.78
as Bell		631 631	422692222222222222222222222222222222222	200 13 20 13 20 13	as Bell La Although nize need a lab, ou does not setting o	631 631	844 844 844 844 844 844 844 844 844 844
such	lab and ing p	1.01	838888888888888888888888888888888888888	. 00.400 R	leading role such That kind of lab is necessary, and we are planning to set one up	1.01	1.02 1.04 0.03 2.18
leading	That kir is neces we are p	œ 60	00-000000000000000	00-00 -	leading role That kind of d is necessary we are plann to set one u	00 to	m440-
: play a	nd of lab ssary, and already one up	0.88	000000000000000000000000000000000000000		ories that play a That kind of lab is necessary, and we are already setting one up	0.88	0.00 1.30 0.00 1.30 0.00 0.00 0.00 0.00
laboratories that play a leading role	That kind of lab is necessary, and is we are already setting one up		00000000-00000		3		OOMNN
ð.	T, T, E	796 796.00	338111284734 1112886687738 30643955	2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	of Fre (to		293 192 230 36
ablishment	Number firms surveyed	831 831	80011 018811 888000 04000000118008000004440		tablishment Number firms surveyed	831 831	2120 2450 3450 3950
Esta		iteral percent	y, and fisher ing ts roducts	g instruments inery unications, ar	.	ateral percent	u,
O. co.	By type of industry	Firms responding Frequency (total value)/Lateral percent	(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Textiles (6) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmaceuticals (11) Other chemicals (13) Plastic products (13) Plastic products (13) Plastic products (14) Rubber products (15) Ceramics (16) Iron and steel (17) Nonferrous metals (18) Metal products (19) Machinery and appliance (20) Electrical machinery and appliance (20) Electrica	(2.1) Communications, electronics, and electrical messuring instruments (2.2) Automobiles (2.3) Other transport machinery (2.5) Other industries (2.5) Other industries public utilities (2.7) Other types of industries	By scale of capital	Firms responding Frequency (total value)/Lateral percent	(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion

Question 9.	About publis	publishing the results from basic	sults from		esearch d	research departments, now	S, now					
By type of industry	Number firms surveyed	Frequency (total value)	Publish more than U.S. and European firms		Publish the same as U.S. an European firms	the I.S. and firms	Do not p much as European	Do not publish as much as U.S. and European firms	Do not basic	: do research	0	0ther
Firms responding Frequency (total value)/Lateral percent	831 831	775 775.00	91 91	2.45	146 146	18.84	208	26.84	340	43.87	62	8
(1) Agriculture, forestry, and fisher		673		9	-		•	6	•			
(2)Mining		, ~		36	٦	25.55	~ ~	24. 24. 24.	⊸ <	33.33	0	e.e
(3)Construction	82	7		2.70	12	16.25	ີ້	20.00 00.00	> =	20.01	> 0	9.00
(4) rood processing	20	-		4.26	• ∞	17.02	;=	36, 17	<u>-</u>	36.17	o ex	2.0
(S) lextites	92	25		0.00	S	22.73	00	36.36	-	31.82	· ~	50.5
(7) Printing and publishing	57 €			9.00	თ.	16.67	m (16.67	2	55.56	~	11.11
(8) Synthetic chemicals	25	. K		25.00	→ ;	33.33	9	0.00	~;	33.33	0	0.0
(9) Oils, fats, and paints	:=	32		00.0	3-	10.00	~~	20.00	3-	70.04	∾ ⊂	s. 36
(1 V) Pharmaceuticals (1 1) Other chemicals	60 r	37		2.70	9	24.32	21	56.76	- 	10.81	~ ~	2.∓ 2.∓
(12)Petroleum and coal products	n ∝	24		2.34	173 -	14.71	Ξ΄	41.18	2	38.24		2.94
(13) Plastic products	2≌	- 81		000		, v.	ی م	32.23	~ 0		~	11.76
(14)Kubber products	۰;	6		0.00	•	99	· ~	20.00		20.00	40	00.00
(16) Iron and steel	25	30		 	∞ :	26.67	တ၊	30.00	2	33.33	8	6.67
(17)Nonferrous metals	98	26			~ u	00.02	~ -	16.29	22	57.14	⊶ €	2.86
(18)Metal products	23	21	0	.0	, es	14.29	• 60	14.29	2.	66.67	٠	4.76
(2.0) Flortnical machinery and appliance		19		7.64	∷	21.31	13	21.31	30	49.18	-	6.56
(2 1)Communications, electronics, and		20 CC			<u>~</u> °	24.36	2	16.67	တ္တ (50.00	، م	7.69
electrical measuring instruments		:		•	•	64.03	h	69.69	0		-	2.63
(2 2)Automobiles	Ç :	e :		2.33	800	18.60	on		22	51.16	ო	6.98
(2 4) Precision machinery	2 72	20 CC	~ <	11.11	· •	5.56	₩.		o n (20.00	~	1.1
(25)Other industries	: -	22	>	36	o -	21. (4	5) t		- ص	20.03	m c	13.04
(26) Fransportation, communications, ar	52	:2		.00	 -	16.67	- ~	00.00 00.00 00.00	12	50.00	>	25.00
public utilities (2 1)Other types of industries	11	17	•	0.00	8	11.76	-		. ග	52.94	N.	29.41
About		publishing the results from basic	ults from b		research de	departments,	, now		:			
By scale of capital	Number firms surveyed	Frequency (total value)	Publish mo than U.S. European f	S. and s	Publish the same as U.S. European fir	pue sui	Do not pu much as Ú European	Do not publish as much as U.S. and European firms	Do not do basic research	do research	6	0ther
Firms responding Frequency (total value)/Lateral percent	8331	775 775.00	<u>61</u>	2.45	971	18.84	208	26.84	340	43.87	62	8.00
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	308 1240 345 39	283 186 227 354	F- 60 60 60 60	8.82 8.82 8.82 8.82	14 83 3 8 14 83 3 8	9.19 17.74 24.67 31.82	03177 03777	33.03 13.93 13.92 5.72 5.72 5.72	28 28 11 85 85 81	25.30 25.30 25.00 86	2222	5.33 5.73 5.73 5.73
				! !		· • • • • • • • • • • • • • • • • • • •	,	;	,	> • •	r	?

VI. Making Rules To Facilitate the Activities of Private Firms

Question 1.	uble with th	e United Sta	ates over	intellect	ual pro	Trouble with the United States over intellectual property rights		
By type of industry	Number firms surveyed	Frequency (total value)	Increasing	sing	2	No change	Decreasing	sing
Firms responding Frequency (total value)/Lateral percent	831 n1 831	629 629.00	150	23.85	79 7	13.17	15	2.38
(1) Agriculture, forestry, and fisher	V.	0	0	0.00	0	0.00	0	0.00
(2)Mining	•	. 73	0	0.00	~	100.00	0	0.00
(3)Construction	22 28	4 3	~	4.65	=	95.35	0	0.00
(4) Food processing	20	34	ဖ	17.65	82	82.35	0	g. 00
(5) Textiles	56	20	~	20.00	18	80.00	0	0.00
(6) Pulp and paper	6	13	~	15.38	=	84.62	0	0.00
(7) Printing and publishing	m	m	-	33.33	~	66.67	0	0,00
(8) Synthetic chemicals	62	53	13	24.53	2	75.47	0	0.00
(9) Dils. fats. and paints	=======================================	o	0	0.00	&	88.83	—	11.11
(10) Pharmaceuticals	33	34	~	20.59	23	79.41	0	0.00
(11)Other chemicals	35	82	5 0	32.14	82	64.29		3.57
(12)Petroleum and coal products	18	91	2	12.50	es :	81.25	(6.23
(13) Plastic products	18	91	m	18.75	~	81.25	-	9.0
(1 4)Rubber products	9	9	p=4 *	16.67	'n	83.33	> (5.0
(15)Ceramics	32	24	•	16.67	20	83.33	> 0	9.0
(16) Iron and steel	36	52	S.	20.00	20	80.08	> (9.0
(17)Nonferrous metals	30	21	→	19.05	1	80.95	۰ د	
(18)Metal products	23	œ		5.56	-	20.00 00.00 00.00	~ €	0.00 1.00
(19) Machinery	79	25	12	23.08	2	21.12	7) (
(20) Electrical machinery and appliance	98	20	27	38.57	9	57.14	, c	67.0
(2 1) Communications, electronics, and		32	2	42.86	20	57.14	>	•
electrical measuring instruments	9	•	•	4	•		•	36
(2 2)Automobiles			on (23.58	7	3.1.	4 6	00.0
(23)Other transport machinery	18	7	ص	42.86	20 (57.14	> <))))
(2 4)Precision machinery	72	21	11	52.38	}~	33.33	M 4	82.41
(25)Other industries	7	10	m	30.00	_	10.00	9	30.0
(26) Transportation, communications,	ar 26	12		8.33	11	91.67	•	0.0
public utilities	11	12	82	16.67	10	83.33	0	0.00
(\$ Juther types of industries	I	!						

Trouble with the United States over intellectual property rights

Ru ers a of capital	Number	Frequency						
מל פרפונ מי כפלוניפו	surveyed	value)	Incre	Increasing	S.	No change	Decreasing	sing
Firms responding Frequency (total value)/Lateral percent	8331 8331	629 629.00	150	23.85	191	13.77	52.5	2.38
(1) ¥1 to 5 billion	80 60	207	308	13.53	174	84.06 75.82	8-	4.58
(4) ¥50 to 10 billion (4) ¥50 to 100 billion (5) Marc than ¥300 billion	24 & & & & & & & & & & & & & & & & & & &	197 31	100	32.49 39.02 38.71	132 193	67.01 56.10 61.29	-80	0.40 188.0

Question 2. S&I	Ļ	elated problems in o	relationships with the United States, now	ips with	the United	States, r	3 0					
By type of industry	Number firms surveyed	Frequency (total value)	Problems to intel property	relating lectual rights	Problems to export laws	relating t control	Problems relating to antitrust law	Problems relating to antitrust laws	Uniticism tha Japan gets a ride on basic research	sm that ets a free basic h	Criticism technoloc ing boxec Japanese	n of Jy be- J in by firms
Firms responding Frequency (total value)/Lateral percen	831 ent 831	772 1153.00	-	34.72	112	14.51	85	7.51	69	8.94	•	1.17
(1) Agriculture, forestry, and fishe	L		•	0.00	0	0.00	0	0.00	0	0.00	0	0.0
(2)Mining		ო	0	0.00	0	0.00	0	0.00	0	0.0	•	0.0
(3)Construction	82	86 60	က	(. 1	,,,,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1.37	10	13.70	9	8.22	-	1.37
(4) rood processing	20	29	2'	26.09	es e	6.52	∾.	6.52	~ .	8.70	•	2.17
(S) rextiles	92	9.6	∽	71.12	7 -	2 8 2 8		. 35 8 8			~ <	9.0
(7)Printing and publishing	1 6	3 67		56.57	→ C	96	- c	9 6	> C	96	>	
(8) Synthetic chemicals	62	76	2,5	00.00	2	16.67	s vo) co	> 00	3.33		0.0
(9) Oils, fats, and paints	=:	21	0	0.0	6	10.00	٥.	0.0	(10.00	0	0.00
(1 U) Pharmaceuticals (1 1) Other Abelian)	to u	27	<u> </u>	7.7	~-	5.56 9.56	٠.	11.11	∾ ເ	5.56	-	9.6
(1.1) Uther chemicals (1.2) Petroleum and coal products		600	3 -	23.53		19:19		5 ec	4 ~	1.00	>	
(13) Plastic products	81	202	• 623	16.67	.0	0.68	•	5.56	•	0.0	• •	0-0
(14)Rubber products	9	თ :	r	20.00	~	60.00	6	20.00	∾.	60.00	0	0.0
(15) Leramics	7 Y	3 9	~ =	31 25	× •	35.30	,3 ev	9. o	→ 67		> -	, c
(17) Nonferrous metals	88	. 60	12	38	-	24.14	. e-2	10.34) L C	17.24	- 0	
(18)Metal products	23	28	ص:	30.00		2.00	~~	10.00	~	10.00	•	0.0
(19) Machinery		100	58	45.16		17.74	S	8.06	9	9.68	2	~
(2 0) Electrical machinery and appliance		123	29	52.50	<u>s</u> :	23.75	٥.	9.6	တ (11.25	α.	2.50
(6 1/Communications, electronics, and alocatrical movements		2	8 2	11.18	2	38.40	-	10.26	"	20.		^
(2.2) Automobiles	1	13	71	•	0	20 02	,		-		0	0.00
(23)Other transport machinery	- 00	5 2	.	; 6	. 67	17.65	• •		_		_	5.88
(2 4) Precision machinery	24	37	===	56.52	-	17.39	~~	8.70	ო.	13.04	0	0.0
(2 5)Other industries	7	23	00	_;	67	23.08	,		⊸ c	•	> 0	
(4 0) Fransportation, communications, public utilities	ar 26	<u></u>	m	12.50	0	0.00	2	•	,		>	9
(27)Other types of industries	11	13	~	25.00	•	0.00	0	0.00		6.25	0	0.00
1#S	-related	problems in	relationships with the United States,	ips with	the United	States, r	now			3	:	
01634-1	Misselbon			1-4:	Dack land	20174-100			Lriticism that	ا د	Lriticism	-
by scale of capital	firms surveyed	(total	to intell	relating lectual rights	to export control laws	control	Problems to antitr	Problems relating to antitrust laws	Japan gets a ride on basic research	9	recondingly be- ing boxed in by Japanese firms	y pe' in by firms
Firms responding Frequency (total value)/lateral percent	831	772	. 892	34, 72	112	14.51	28	7.51	59	6	on -	1.17
		:									1	
(1)¥1 to 5 billion (2)¥5 to 10 billion (3)¥10 to 50 billion (4)¥50 to 100 billion (5)More than ¥100 billion	22 - 23 24 - 20 20 - 2	22 28 28 34 36 36 36 36 36 36 36 36 36 36 36 36 36		23.05 35.33 44.20 52.27	∾ or or or	11.70 16.85 14.29 15.91	6 2 0 6 4 6 0 0 6 4	3.19 8.19 20.93 10.53	277	6.38 6.52 10.71 15.91	400m	1000
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		No problems	35.75	56.00 56	33.75 12.82 27.91 35.29 34.78 58.33	37.50	problems	323. 222. 34.21
		8	276	20083111088711158500	25 27 27 27 27 27 27 27 27 27 27 27 27 27	6	\$ 5	124 60 61 13
•		Existence of large technological gaps (with Japan in the superior position)	6.03	25.00 25.00	6.25 15.38 6.98 6.98 15.38 4.17	12.50	Existence of large technological gaps (with Japan in the superior position)	. രായാധം
		Existence of technological (with Japan is superior positions)	1.7	0 C 10 m 0 - 0 m 4 0 m - N	ND WOOM-	8	Existen technol (with J superio	2 2 2 2 2 3
		of thinking social ibutions tions, etc.)	4.27	00000000000000000000000000000000000000	5.00 5.13 6.98 0.00 0.00	0.00	Ways of thinking about social contributions (donations, etc.)	6.52 0.00 0.00 0.00
	now.	Ways of think: about social contributions (donations, e	88	00000000000000000	40 00400	900	Ways of think about social contributions (donations,	2 22000
	d States,	Growing diffi- culty in accessing S&T information	6.22	0.00 4 4 0.00 0.00 0.00 0.00 0.00 0.00	3.75 10.26 11.63 11.76 4.35 4.35	0.00 d States.	Growing difficulty in accessing S&I information	
	the United	Growing culty in accessin informat	*	00F0000mmm4m0m400m4	mw www	0 the United	Growing culty in accessing informati	. 24264
		Growing difficulty in introducing technology	13.60	0.00 1.10.00 1.00.00 1	20.51 13.95 5.88 4.35 15.38	0 0.00 ationships with	Growing diffi- culty in introducing technology	15.76 19.20 25.00 10.53
	relationships with	Growing diff culty in introducing technology	105		, co co co	0 relations	Growing diff culty in introducing technology	14.23 88 4.33 18
	problems in r	Frequency (total value)	772 1153.00		123 78 21 37 31 31	19 problems in	Freq (toti	2879 2879 809 65
	lated	Number firms surveyed	831	80.24 0 - 80 - 80 - 80 - 80 - 80 - 80 - 80 -		17 -related	æ • ¤	2 2 2 3 3
	S&T-T&S	By type of industry	Firms responding Frequency (total value)/Lateral perceni	(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Textiles (5) Pulp and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmaceuticals (11) Other chemicals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (14) Rubber products (15) Ceramics (16) Iron and steel (17) Monferrous metals (18) Metal products (19) Machinery	(2 0) Electrical machinery and appliance (2 1) Communications, electronics, and electrical measuring instruments (2 2) Automobiles (2 3) Other transport machinery (2 4) Precision machinery (2 5) Other industries (2 5) Transportation, communications, are (2 6) Transportation, communications, are	public utilities (2 7)Other types of industries S&T-re	By scale of capital	(1) %1 to 5 billion (2) %5 to 10 billion (3) %10 to 50 billion (4) %50 to 100 billion (5) More than %100 billion

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By type of industry	Number firms surveyed	Frequency (total value)	Problems to intell property	Problems relating to intellectual property rights	Problems relating to export control	relating	Problems reto antitrus	elating st laws	Criticism that Japan gets a fr ride on basic research	ä	Criticism of technology be- ing boxed in by Japanese firms	m of gy be- d in by firms
Firms responding Frequency (total value)/Lateral perceni	831 831	749 1261.00	362	48.33	120	16.02	67		65		21	2.80
(1)Agriculture, forestry, and fisher	v	-	•	0.00	φ.	0.00	0	0.00	0	0.00	0	0.00
(2)Wining	~ €	۳:	- ج	9.6	-	0.0 3.00	0]	9.00	o -	2,00	۰ ۵	0.00
(3)construction (4)Food processing	2 5	114	702	11.67	- 1/3	11.90	2	7.76	. 643	7.16	, 0	0.00
(5) Textiles	9 7 8	3 69	; ∞	36.36	~~	9.09		4.55	.—	4 .55	0	0.00
(6) Pulp and paper	19	24	S	29.41	~	17.65	~	11.76	 (8 6	0	0.0
(7)Printing and publishing	က	~;	~;	20.00	۰:	9.00	00	9.00	- •	9.6	٥-	
(8) Synthetic chemicals	79	[]-	7	17.87	3 -	20.00	o	67.6	-	20.00	- c	
(1) Pharmaceuticale	- & - &	2 F	۰ 🗠	51.63	. 🤜	11.43	~	2.5	· (*)	8.57		2.86
(11)Other chemicals	3 6	61	:::	54.84	œ	29.03	· 67	9.68	-	12.90	~~	6.45
(12)Petroleum and coal products	28	23	~	23.53	2	11.76		8	m (17.65	0	0.00
(13) Plastic products	<u>8</u>	02: 20:	w -	23.41	۰ د	0.00 30.00	c	. c	-	0.00	-	0.00
(14)Kubber products	ء ۾	→ 8		70.07	2 C	7.14	-	3.50	دی	10.71		3.57
(16) Iron and steel	3 65	9	:::	20.00	' =	36.67	, ro	16.67	•	0.00	~ ~	6.67
(17)Nonferrous metals		52	16	59.26	~	14.81	es (1:1	 (0	0.0
(18) Metal products		30	=	50.00	~ ;		~.	ص ص ص	۰.	8.6	«	.55
(19) Machinery		107	SS.	200		20.00	n c	 	ه م	35	~ 6	9.6
(2 U)Electrical machinery and appliance (2 1)Communications alsotropies and		129	32	33.78	3 7	37.84	o 🕶	10.81	o 🕶	10.81	۰.	2.70
electrical measuring instruments		3	;		;							
(2 2)Automobiles	~	16	21	47.73	œ,	20.45	~	60.6	.	11.36	~	55
(2 3)Other transport machinery	<u> </u>	25	9	35.29	—	23.53	0	0.00		3.00	-)))
(2 () Precision machinery	77	1	Ξ΄	60.87	~ (17.39	~ -	2.5	- -	25.7	€	÷.
(2 2)Uther industries	<u> </u>	23	5 7 (69.23	>> •	19.38	c	60.63	۰ د	n	- c	9
(20) Fransportation, communications, an numblic etilities	~	es S	-	29.17	-	0.0	7)	12.50	y	9.00	>	3.
(2 7)Other types of industries	1.1	22	œ	47.06	0	0.00	0	0.00	-	5.88	0	0.00

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scale of capital	Number	Frequency	Problems	relating	Problems	relating			Japan get	s a free	technolog	- ad-
	firms	(total	to intell	ectual	to export	control	Problems	relating	ride on b	asic	ing boxed	in by
	surveyed	value)	property	rights	laws		to antitu	ust laws	research		Japanese	firms
rms responding equency (total value)/Lateral percent	831	831 749 rcent 831 126 16.02 67 8.95	362	48.33	120	16.02	29	8.95	8.68	8.68	21 2.80	2.80
(1)¥1 to 5 billion	308	60	06	33.46	37	13.75	23	4.83	11	6.32	m	1.12
	188	312	76	53.11	34	19.21	∞	10.17	:	6.21	-	2.26
	240	396	130	58.30	32	14.35	71	9.42	23	10.31	80	3.59
	(5	68	82	66.67	2	23.81	2	23.81	- -1	15.67	2	9.7
	39	16	20	52.63	-	18.42	S.	13.16	2	18.42	-	10.53

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By type of industry	Number firms surveyed	Frequency (total value)	Growing difficulty in introducing technology	diffi- n cing ogy	Growing diffi- culty in accessing S&T information		Ways of thinki about social contributions (donations, et	ر.)	Existenc technolo (with Ja superior	Existence of large technological gaps (with Japan in the superior position)		No problems
Firms responding Frequency (total value)/Lateral percent	831 1 831	749	151	20.16	72	19.6	35.	4.67	. #	10.28	82	25.10
(1) Anniculture forestry and fisher		•	•	6	c	6	•	6	<	6	<	0
(2)Mining		-1 67	> <	;	> <	30	>) C	>	90	> ~	66.57
(3)Construction	• 6	?:	~ ~	20.81	> a	3=	-	- C	• •	12.50	• =	10.
(4) Food processing	1 C	£14 £2	30	21.43	o er	7	- =		•	7.14	~	30.95
(5)Textiles	26	, ca	'n	22.73	, —	55	0	0.00	~	9.09	9	40.91
(6)Pulp and paper	19	24		5.88		5.88		0.00	0	0.00	2	58.82
(7) Printing and publishing	873	~~	0	0.0	0	9.0	0	0.00	0	0.00		50.00
(8)Synthetic chemicals	62	101	91	28.57	~	3.57	0	0.00	9	10.71	8 2	32.14
(9) Oils, fats, and paints	=	15	7	20.00	_	19.00	0	0.00		10.00	ဖ	60.00
(10) Pharmaceuticals	۳ ش	83		37.14	го ·	14.29	0	9:	vo e	14.29	ب ع	7.7
(1 1) Uther chemicals		190	ക്	16.13	٠,	12.90	~ <	•		86.22	۰ م	2.57
(1 2) Petroleum and coal products	æ (823	.	21.76	«	».«	۰.			, n	,, t	2:
(1 2) Flastic products	2 °	2.	₩.	25.33	> •	0.00	→ -	3.00	٠.	32.00		16.10
(15) Teramice	- Ç	* *	- W	10.01	→ L/	17.8	- ~		.	2.0	- 0	32.17
(16) Iron and steel	2 4	9 4	s iv	72.27			۰.	2.5) er		, v	. F. F.
(1 7) Nonforman motals	9 6	5 6	>	20.01	a (33.33	.			2.5	, 4	99.99
(1 %) Motol products) c	200	- 6	19.00	o -	77.77	t-	7.5	-	32.7	> ~	77.77
(1 0) Machiner		200	? :	20.0	→ :		٠ د	2	- -	•	. :	20.00
(9 A)Cleatelter marking and mark		- 6	- u	70.00	17	10.00	5 u	200	15	13:00	1 -	200
(9 1) Commissed machinery and appliance		671	2 -		+ (07.01	n e	0.0	34	10.10	7-	7
<pre>\c 1/communications, electronics, and \langle lootsist lootsist</pre>		79	-	01.67	Þ	77.01	•	1.0	•	77.01	-	-
(9 9) Outomobiles	•	10		4 40	· c	. 60	٠,	6	•	6	٠	10
(9 3)Other terrorates	.	e :	3,		~ (70.0		n 0		7 C		15.61
(2.4)Practicion machinery	× 7 0	67		20.00	4 6	1. 6 2. 7	6 *	20.00	~ €	000	n u	14.62
(2.5) Other industries	7.	7.6	? ~	200	4		-	20.5	• ~	20.00	.	20.07
(2.6) Transportation communications	- €	32	-	20.7	٠.	200	4	7	• ~	 	•=	200
	4	3	-		4	?	•		•	?	1	20.05
(27)Other types of industries	11	22	7	11.76	0	0.00	0	0.00	m	17.65	vs	29.41
- 1855		elated problems in relationships with the United States	elationsh	ins with t	he United	States	in the future	+11120				
				-				ָּע ע פֿריי				
By scale of capital	Number	Frequency	מנייסום	Growing diffi-	Growing diffi	diffi-	Ways of	of thinking	Existence	Existence of large		
	firms surveyed	(total value)	introducing	lcing logv	accessing S&T	ng S&T	contributions	tions September	(with Ja	(with Japan in the	2	- Jame
Firms responding		•		16				;	3000	hosterod	2	
Frequency (total value)/Lateral percent	831	1261.00	151	20.16	12	9.61	35	4.67	11	10.28	188	25.10
///// 4 - E 1:11:	;		•	:	;			6			ě	. 16
(1)*1 to 3 pillion (2)*5 to 10 billion (3)*10 to 50 billion (4)*50 to 100 billion (5) More than M100 hillion	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	11112	23.73 27.35 26.19	7 2 2 2 1 2 1 2 1 2 1 3 1 3 1 3 1 3 1 3 1	9.04 14.29	2220		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	10.76 10.76 19.05	,	23.34 11.833 23.9034
	n 3	<u>-</u>	•	****	•		•	-	•	•	•	

Regulations on the transfer of chemical weapons technology Product liability Items for which the existence of a worldwide common base in R&O activities is desired Environmental regulations A taxation system for R&D activities An intellectual property rights system Frequency (total value) 1384.00 Number firms surveyed 831 Frequency (total value)/Lateral percent 831 (1)Agriculture, forestry, and fisher (2)Mining (3)Construction (19)Nachinery (20)Electrical machinery and appliance (21)Communications, electronics, and 2) Petroleum and coal products (6)Pulp and paper (7)Printing and publishing (8)Synthetic chemicals 9) Oils, fats, and paints (17) Nonferrous metals (13) Plastic products (14) Rubber products (15) Ceramics 10) Pharmaceuticals 4) Food processing 1)Other chemicals By type of industry (18)Metal products (16) Iron and steel 5) Textiles **Question 3.**

for which the existence of a worldwide common base in R&D activities is desired	Regulations on the intellectual A taxation the transfer of property rights system for R&O Environmental Product chemical weapons system activities regulations liability technology	154 19.11 161 19.98	163 54.88 20 6.73 67 22.56 63 21.21 125 64.43 11 5.67 33 17.01 39 20.10 173 74.25 18 7.73 41 17.60 50 21.46 37 84.09 9 20.45 9 20.45 9 20.45 28 73.68 7 18.42 4 10.53 0 0.00
the exist	Frequency (total value)	806 1384.00	200 400 400 62 62
Items for which	By scale of capital firms surveyed	Firms responding Frequency (total value)/Lateral percent 831	(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion (5) More than ¥100 billion

18.18 33.33 34.78 21.43 4.35

61.36 50.00 78.26 64.29 73.91

6)Transportation, communications, ar public utilities

(27)Other types of industries

(2 3)Other transport machinery (2 4)Precision machinery (2 5)Other industries

electrical measuring instruments

(22)Automobiles

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By type of industry	Number firms surveyed	Frequency (total value)	respect trions wit	regulations with respect to rela- tions with strife- torn countries	Product standards	şp	connection with subsidies and loans from each country's government		tions by cation of research	Local contribu- tions by publi- cation of basic research results	Noth: part:	Nothing in particular
Firms responding Frequency (total value)/Lateral percen	831 n 831	806 1384.00	14	1.74	306	37.97	37	4.59	45	5.58	62	7.69
(1)Agriculture, forestry, and fisher		9	•	۰.	8	66.67	0	0.00	0	0.00	0	
2)Mining	-	ιν	0	۰.	-	25.00	•	0.00	0	0.00		_
3)Construction	82	136		~	7	50.62	ω	7.41	∞	88.6	o,	
4)Food processing	20	80		٥.	16	33.33	0	0.00	2	4.17	œ	
5) Textiles	56	9.	0	۰.	2	38.46	ö	0.00	~	7.69	 -	3.85
6) Pulp and paper	19	33	0	٥.	~	21.05	e	15.79	~	21.05		
7)Printing and publishing	က	9	Φ:	٥.	က	100.00	0	0.00	0	0.00	0	_
ynthetic chemicals	29	100	m	6.	12	19.61	2	3.28	7	3.28	· •	
Oils, fats, and paints	==		0	٠.	~;	8.8	0	0.0	٥,	0.00	6	-
U/Pharmaceuticals 13046	10 to	2	> ¢	? °	⊒:	22.27	~ ~		• •	20.03	4 c	
Uther chemicals	n -		> C	? <	.	70.77	- <		4 -		> -	
plactic coding of products	0 0	100	> c	•	o 42	20.00	-	, v	- c			-
4)Rubber products		3			~	66.67	••	000	•	00.0	•	
Ceramics	32	5	-	~	· 05	29.03	-	3.23	~	9.68	-	
Iron and steel	36	26	0	0	<u></u>	51.43	84	5.71	7	5.71	m	
7)Nonferrous metals	30	21		7	2	41 .38	es .	10.34		3.45	•	0
8)Metal products		e .	01	•	 	56.52	·	. 35 . 35	۰.	0.00	~	× .
achinery		105	m -	œ. c	7 7	38.71		19.0	a c	3.00	o u	2 K
V/Electrical Machinery and appliance 1)Communications electronics and	≠ 5 8 €	141	 C	00.0		31.00	- ~	5.26	o –	2.63	• 0	00.0
electrical measuring instruments		2	•	•	:		•	;	•	}		¥
utomobiles	_	92	7	'n	15	34.09	-		0	۰.	~	
3)Other transport machinery	18	31	-	'n	-	38.89	-	•	-	'n.		5.56
4)Precision machinery	24	2 5	0	0.00	 6	30.43	0	9.6	0	900	⇔ ∈	
Sytther industries	40	9 6	-	٠,	3 0 t	37.14	-	•	> •	? ~	>	
V/!ransportation, communications,	97 Je	n	-	3	-	50.43	-	•	•	:	•	
(2 7)Other types of industries	11	53	0	0.00	ĸ	29.41	8	11.76	8	11.76		5.88
Item	ems for which	the	existence of a	worldwide	common b	base in R	R&D activit	activities is de	desired			
Legione de element			Regulatio	egulations with			foreign firms in	rms in	Local	contribu-		
וע מו כפלדופו	Number firms surveyed	Frequency (total value)	respect to relations with strift torn countries	ct to rela- : with strife- countries	Product standards		subsidies and loans from each country's	and loans country's	tions cation	tions by publication of basic research results	Noth part	Nothing in particular
Firms responding Frequency (total value)/Lateral percen	at 831	806 1384.00	=	1.74	306	37.97	37	4.59	45	5.58	. 29	7.69
			٠	•	:		:	•	ć			5
(1)*1 to 3 billion (2)*5 to 10 billion (3)*10 to 50 billion (4)*50 to 100 billion	2008 440 5008	334 405 77	~~~	0.138 0.038 0.0038	288 888 588	38.05 47.94 36.91 11.35	1068		3004	3.86 9.98 9.98	2002	5.15 4.29 4.55
5) More than ¥100 billion	39	29		9	on	23.68	S	13.16	~	7.83	က	٠ <u>.</u>

Question 4. R&D for	R&D for solving o	global environmental problems	onmental	problems				
By type of industry	Number firms surveyed	Frequency (total value)	Doing	Doing such R&D	Inves	Investigating such R&D	Not such	Not doing such R&D
Firms responding Frequency (total value)/Lateral percent	831 831	821 821.00	270	32.89	123 123	14.98	4 28	52.
(1)Agriculture, forestry, and fisher (2)Mining	20.4	10 4		20.00	0-	0.00	~ "	80
(3)Construction	* 23 83	* 23 °	5 6	31.71	- 82	21.95	7 gg	6.6
(4)rood processing (5)Textiles		Š Š	00 (c	16.00	ري د م	10.00	37	7.
(6) Pulp and paper	35	18	°2	55.56	• 62	16.67	N	27.
(1)Printing and publishing (8)Sonthetic chemicals	ຕະ	ຕິ	2 y	66.67	0	33.33	0	0
(9) 0ils, fats, and paints	3=	101	3 9	60.00	n 0	0.00	9~	9
(1 0)Pharmaceuticals		& & & & & & & & & & & & & & & & & & &	~;	5.26	4	2.63	33.	92.
(12)Petroleum and coal products	Ç œ	186	300		o vo	27.78		27.
(1 3) Plastic products	<u>~</u>	8	œ c	44.44	(7)	16.67	·~ (38
(15)Ceramics	96	200	7 6	22.23	~ u	15.33	2 0	33
(16) Iron and steel	36.	900	21		э ம	16.67	9 00	50.0
(17)Nonferrous metals	30	90	2	33.33	1	16.67	15	50.0
(1 9) Machinery	23	22	76	90.00	91	0.00	20	8.6
(20) Electrical machinery and appliance	7 6	# er;	3 =	37.04	- =	19.04	* c	200
\Box	38	9 9		23.08	-	17.95	225	58.9
electrical measuring instruments	1		,					
(2.2)Automobiles (2.3)Other transport machinery	7		21	60.00	œ c	17.78	25	22.2
(2 4)Precision machinery	24	76	> ¬	15.57	40		<u>></u> ∝	0.00
(2.5)Other industries	1	. 71	· 63	21.43	φ.	42.86	'n	35.7
(2 b) Transportation, communications, ar	5 6	25	=	44.00	9	24.00	~	32.0
(2 1)Other types of industries	11	11	•	35.29	-	5.88	10	58.8
R&D for	solving	global environmental problems	onmenta]	problems				
By scale of capital	Number firms surveyed	Frequency (total value)	Doing	such R&D	Inve	Investigating such R&D	Not such	Not doing such R&D
Firms responding Frequency (total value)/Lateral percent	831 831	821 821.00	270 270	32.89	123	14.98	428 428	52.1
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	304 238 385 385 385	949978 94978	19.41 40.34 15.56 18.95	4m94m	14.47 15.82 16.81 11.:11	201 102 102 6 5	66.1 22.8 13.3

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	value) governments over	Seas	expected in f	future	mental p	problems	Other	L
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electrical measuring in)))))	
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Other transport machinery 18 8		9.0	29	2.50	~	25.00		12.50
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74		0.00	~ '	1:	10	55.56	~	۵. د د
-1		11.10	e	1.	m	17.65	-	×
7)Other types of industries 17 7 0	•	0.00	2 28	. 57	ო	42.86	2	28.57
R&D for solving global environm	bal environmental	problems						
Techno scale of capital Number Frequencyinto e firms (total funds surveyed value) govern	lechnology expected t into effec unds from	is Dut DOA, 1	Technology for coping with government restrictions of each country that are expected in future	_=	Development nology that contribute tion of envi	that will ute to solu- environ- problems	- Other	_
393 393.00	8	6.62	24	96		29.77	34	8.65
		!						
1)¥1 to 5 billion 308 104 6 2)¥5 to 10 billion 240 133 10 4)¥50 to 100 billion 45 39 5 5) Wore than ¥100 billion 39 34 1		7.82 7.82 7.82 7.94	55 44 71 22 24 53 24 70	8 - 8 - 8 - 8 - 8	45.42	32.69 32.53 30.83 14.11	5827 5827	8.65 9.64 8.27 5.13

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Changes
Question 5.

			:		Expansion	on of the	Nation	al leader-	Impart	ing the		
By type of industry	Number	Frequenc	Kethinkir V legal red	Kethinking Japan's Jegal regulations	s nation's for R&D	nation's support	ship s	ship such as in	right	right knowledge		
	firms surveyed	(total value)	and other	such	subsidies	s, a tax-	of research	earch rships	3 % = =	Japan, raising ir consciousness		Other
Firms responding		218	166		250		135	-	248		S	į
rrequency (total value)/Lateral percen		812.00	166	20.44	220	30.79	135	16.63	248	30.54	S	0.62
(1) Agriculture, forestry, and fisher		w	2	40.00	-	20.00	8	40.00	0	00.00	c	00.0
(Z)MINING	•	7	•	0.00		25.00		25.00	~	50.00		00.0
(3) construction	20	~ ·	6	23.46		28.40	15	18.52	22	27.16		1.23
(4)rood processing	0° .	5	י כע	10.20		24.49	9	12.24	22	51.02		2.04
(D) lextiles	92	92	~ (26.92		34.62		3.85	∞	30.77	_	3.85
(0) Printing and publishing	F. (5. °	~	10.53		26.32	~	21.05	6 00	42.11	0	0.0
(8) Conthetic chemicals	ກຄູ		- :	20.00		33.33	~ ;	66.67	0	0.00	0	0.0
(9) 0118. fats, and naints	7 - 0 -	<u> </u>		20.00		22.95	25	19.67	∞ °	29.51	0	0.0
(10) Pharmaceuticals	- 00	- eq	- 46	15.79		27.20	> 6	 	2 2	00.07	-	90.0
(11)Other chemicals	35	88	S	15.15		3.8	4 F-	21.21	9 =	30.30	- c	20.0
(12) Petroleum and coal products	18	-		5.88	=	64.71	· 60	17.65	2~	11.76	•	000
(13) Plastic products	8 °	∞,	→.	22.22		33.33	-	5.56	ယ	33.33	•	0.0
(1.5) Ceramics	۵ د	~ c	L	16.67		33.33	~ 1	33.33	 (16.67	0	0.00
(16) Iron and steel	2 y x	250	0 F	20.63		40.63	~ 6	21.88	ı,	18.75	(3.13
(17)Nonferrous metals	900	38	ی -	20.00		30.00	n ¬	12.72	- =	20.00	> <	9 6
(18) Metal products	23	22	.	27.27		200	• ^	20.0	:-	30.05	> <	96
(19) Machinery	79	62	21	33.87		17.74	. 2	16, 13	20	32.26	•	00.0
(Z 0) Electrical machinery and appliance	₹	82	7	17.07		24.39	12	18.29	30	36,59	• 0	0.00
(2 1) Communications, electronics, and	33	ထ	~	18.42		47.37	ω	15.79	S	13.16	•	0.00
electrical measuring instruments	1											
(2.2) Additional productions	L	S.		œ.	Ξ	24.44	S	0	=	7.	0	0.0
(2.4.)Precision machinery	~ ?	<u>_</u> ;	u0 u	29.41	→ (23.53	~	11.76	9	35.29	0	0.0
(25)Other industries	32	57	o =		- م	26.09	~ .	m.	90 4	-:		9.0
(26) Transportation, communications, an		50	-	ġ,	• <u>-</u>	70.07	- -		~ •	 	> c	3 6
public utilities		:	•	•	2	36.00	•	00.00	_		>	3
(27)Other types of industries	11	11	~	11.76	9	35.29	~	23.53	us.	29.41	0	0.0
Chang	es	in the domestic	situation s	surrounding firms								
B. co. to at the state of the s			Dathining	1	Expansi	on of the	Wational	l leader-	Imparti	ng the		
oy scare of capital	Number	Frequency	/ legal regulations	g Japan s Llations	for R&D,	support e.g.,	ship su the est	ship such as in the establishment	to the	right knowledge to the citizens		
	firms surveved	(total s	and other	snch	subsidie	s, a tax-	of research	arch	of Jap	an, raising	O+hor	,
Firms responding	•	812	166		950		125		17 arc	JUSCIONSHESS		.
Frequency (total value)/Lateral percent	831	812.00	166	20.44	250	30.79	135	16.63	248	30.54	ດ ທ	0.62
(1) ¥1 to 5 billion	308	302	2		73	24.17	26	S	96	31.79	~	99.0
(2)*5 to 10 billion (3)*10 to 50 billion	240	233.	- 9	21.13	1917	30.44	9 50 3 60 3 60	14.95	51 76	31.44	~	0.52 0.86
(4) ¥50 to 100 billion	.	5	so c		22	60.00		-	-	8	0	9
(3) More than \$100 Diliion	ממ	5	7		20	12.7	٥	-	7	28.93	0	00,0

Change	m	in the international situation surrounding firms	l situati	on surrour	oding fir	8					Mutual under- standing with	der- vith
By type of industry	mber rms rveyed	uency al	Standardization of legal regulations and other such systems by countries	zation regula- l other ems by	Smooth p of inter joint re	Smooth promotion of international joint research	Leadership from the advanced countries		Developing countries understand- ing towards global environmental problems	coun- rstand- global al	differences depending on th country in the recognition of problems	on the on of
Firms responding Frequency (total value)/Lateral perceni	831 831	808 808.00	220 220	27.23	160 160	19.80	185 185	22.90		6.56	821	22.03
(1) Agriculture, forestry, and fisher (2) Mining (3) Construction (4) Food processing (5) Putils and paper (7) Printing and publishing (8) Synthetic chemicals (9) Oils, fats, and paints (10) Pharmacuticals (11) Other chemicals (12) Petroleum and coal products (13) Plastic products (13) Plastic products (14) Rubber products (15) Ceramics (15) Ceramics (16) Iron and steel (17) Nonferrous metals (18) Machinery and appliance (19) Machinery (20) Electrical machinery (21) Communications, electronics, and (21) Communications, electronics and (21) Charasport machinery (22) Other industries (23) Other industries (21) Other types of industries (27) Other types of industries	5 82 82 126 13 13 11 13 11 13 33 33 33 34 47 47 14 14 17 14 11 14 11 14 11 14 11 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	-m		5	222 222 223 333 1155 135 135 135 135 135 135 135 1	22 27.50 9 18.37 5 19.23 0 0.00 0 0.00 0 0.00 14.75 1 21.21 2 22.22 4 11.43 5 22.73 15 22.73 15 22.73 15 22.73 15 22.73 15 22.73 15 22.73 15 22.73 16.05 9 35.29 6 35.29 5 21.74 5 21.74 5 22.73 16.05 9 37.50 5 21.74 5 21.74 5 21.74 5 21.74 5 21.74 6 35.29 9 37.50 9 37.50	22 20.00 24 21.50 7 14.29 7 26.92 8 31.58 9 23.68 1 10.00 1 10.00 1 21.21 2 23.68 3 35.29 3 36.72 6 20.00 6 13.33 1 27.42 1 18.52 1 18.52 1 18.52 1 21.21 2 23.53 1 4 28.57 4 23.53 1 6 20.00 6 13.33 7 23.53 1 6 23.53 1 7 65 2 23.53 1 7 65 2 20.00 4 23.53 2 20.00 4 23.53 1 6 20.00 6 23.53 1 7 65 2 20.00 6 20.00 7 20.00 7 20.00 7 20.00 8 20.			0.00 0.00 0.00 10.20 10.20 10.20 3.28 3.28 5.26 0.00 0.00 11.76 6.17 6.67 6.17 6.17 14.29 16.67 17.65	Martin 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	40.00 23.75 23.75 23.75 36.51 36.51 34.43 36.51 34.43 34.43 37.21 27.21
Firms responding Frequency (total value)/Lateral percent	831 831	808 808.00	220 220	27.23	160 160	19.80	185	22.90	88 88	6.56	178	22.03
(1) ¥1 to 5 billion (2) ¥5 to 10 billion (3) ¥10 to 50 billion (4) ¥50 to 100 billion (5) More than ¥100 billion	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	301 232 384 384	52823	26.25 33.68 25.43 13.16	លេខ សសសឧ	2011 2011 2011 2011 2014 2014 2014 2014	537 12 12 14	22.26 19.69 26.29 15.91	1123	6.22 6.22 6.03 10.53	82228 82228	20.93 22.28 22.41 27.27 21.05



V. The Questionnaire

Management and Coordination Agency, Endorsement No. 17880 Period of endorsement: Until 30 July 1991

CONFIDENTIAL

Survey Report on Research Activities in Private Enterprises

This questionnaire will only be used for statistical purposes, so please fill in true facts.

Science and Technology Agency, S&T Policy Bureau

I. Fill in the table below to give a summary of your company.

3) Company name	
Respondent	(Names of your division and department):
	(Your name): (Telephone No.):
4) Type of industry (Note 1)	5) Capital (as of 31 March 1991): x ¥100 million
7) FY90 sales	x ¥100 million
FY90 R&D expenditures (Note 2)	12) Total: 13) Basic research outlays: 14) Applied research outlays: 15) Development research outlays: Y million Y million
Consumption tax accounting p 1. Tax-subtracted method	processing 2. Tax-included method
16) Total number of employee (Note 3)	es (as of 31 March 1991):
17) Number full-time researd (Note 4): (20) Foreign res	chers (as of 31 March 1991) searchers among those (Note 5):
18) Number of patents held i	n Japan (the number of patents in Japan technology that your company developed
Remarks (change of address, and other relevant informati	address to which report is to be sent, on):

- Note 1) For the type of industry, fill in the number from the table of industrial categories that corresponds to your company's product item with the largest amount of sales in FY90.
- Note 2) R&D expenditures are the total amount of R&D-related outlays for personnel, raw materials, property, plant, and equipment. Fill in the amount of outlays for each of the following items.

Basic research: theoretical or experimental research for the purpose of forming hypotheses and theories, and not something that is expressly for a special application or use; or for the purpose of gaining new knowledge in connection with phenomena and observable facts.

Applied research: research that uses knowledge that was discovered through basic research, establishes specific objectives, and verifies the possibility of practical application; or research that searches for new application methods in connection with methods that have already been put into practical use.

Development research: research that is the utilization of the knowledge gained from applied research and actual experiments, the objective of which is to introduce new materials, apparatuses, products, systems, processes, etc., or to improve these.

- Note 3) Fill in the total number of people employed at your company for at least one month as staff members or as officers.
- Note 4) People who have completed university (excluding junior college) course work (or who have the equivalent or higher specialized knowledge) and who have at least two years of research experience; or, people who have been employed at your company for at least one month and who have a specific theme on which they are doing research. Note 5) Foreign researchers are people engaged in research activities whose nationality is other than Japanese and who have at least a month—long contract with your company. This does not include people whose research activities at your company are in the form of joint research, training, etc. (This is the same as last year's survey.) The other conditions are the same as in Note 4 above.
- Note 6) This is for registered patents and does not include utility model rights, design rights, or trade-mark rights. This also does not include patents whose term of existence (in Japan, 15 years from the day that the application was released) has been exceeded.
- Note 7) The number of patents held outside of Japan is the number of patents registered in foreign countries (including the European Patent Agency. If the same patent is registered in more than one country, count the number of countries in which the patent is registered.

No.	Type of industry
1	Agriculture, forestry, and fisheries
1 2 3 4	Mining
3	Construction
4	Food processing
5	Textiles
5 6 7	Pulp and paper
	Printing and publishing
8	Chemical fertilizers, inorganic chemicals, organic chemicals,
	and chemical fibers
9	Oils, fats, and paints
10	Pharmaceuticals
11	Chemicals not covered in items 8~10
12	Petroleum and coal products
13	Plastic products
14	Rubber products
15	Ceramics
16	Iron and steel
17	Nonferrous metals
18	Metal products
19	Machinery
20	Electrical machinery and appliances
21	Communications, electronics, and electrical measuring instruments
22	Automobiles
23	Transport machinery not covered in item 22
24	Precision machinery
25	Industries not covered in items 4~24
26	Transportation, communications, and public utilities
27	Other types of industries

II. Fill in the total sales and R&D expenditures of all of your company's overseas affiliated firms (50% or more financed) for FY90.

Sales: ¥million

R&D expenditures: ¥ million yen

III. Perception of International Situation in Relation to S&T

Question 1. In comparison with the U.S. and Europe, how do you rate your company's R&D strength in the industrial category under which your company falls? For five years ago, now, and five years from now, circle the one number that corresponds to your answer.

Note) In the case where your company's R&D in its respective industrial category covers several departments, give an answer for your R&D strength in connection with your major product.

	5 years ago	Now	5 years later
1. Japan > U.S. > Europe	1	1	1
2. Japan > Europe > U.S.	2	2	2
3. U.S. > Japan > Europe	3	3	3
4. U.S. > Europe > Japan	4	4	4
5. Europe > Japan > U.S.	5	5	5
6. Europe > U.S. > Japan	6	6	6
7. Japan > U.S. = Europe	7	7	7
8. U.S. > Japan = Europe	8	8	8
9. Europe > Japan = U.S.	9	9	9
10. Japan = Japan > Europe	10	10	10
11. Japan = Europe > U.S.	11	11	11
12. U.S. = Europe > Japan	12	12	12
13. Japan = U.S. = Europe	13	13	13
14. Don't know	14	14	14

Question 2. In the international situation surrounding Japan, various problems in the economic face of things are arising, number one of which is trade problems. In connection with S&T, what do you think? Keeping in mind the category of industry under which your company falls, circle one of the numbers below that corresponds to your answer.

No.	
1.	Because other countries will also be building up their S&T strength, which is the wellspring of economic power, tense international relations in connection with S&T (technology disputes, etc.) will become more intense.
2.	Competition involving S&T among Japan, Europe and the United States will exist in the future, too, but there are also continuing efforts that grope for cooperation in regions, so tense international relations will continue partly and intermittently.
3.	In S&T activities, progress will be made in international cooperation, and tense international relations will diminish.
4.	Because the three poles—Japan, Europe, and the United States—are moving towards becoming economic blocks, there will be no progress in international cooperation with respect to technology, and tense international relations will also diminish.
5.	Other

We asked the following question of firms that answered 1. or 2. to the question above.

If tense international relations in connection with S&T do not disappear, how will your company cope with the situation? Circle one of the numbers below that corresponds to your answer.

No.	
1.	Technology transfer (providing technology to firms in the area, transferring technology to subsidiaries in the area, etc.).
2.	R&D cooperation.
3.	Establishing R&D strongpoints overseas.
4.	Endeavoring to gain the understanding of society in the area.
5.	We will not deal with it in any active way.
6.	Other

Question 3. How does your company see the technological strength of the Asian NIEs (in particular, Korea and Taiwan) in the same category of industry? Circle one of the numbers below that corresponds to your answer.

No.	
1.	They are now our competitors.
2.	Later (after three to 5 years) we think they will become our competitors.
3.	They will not become our competitors for a long time (more than seven or eight years).
4.	Other

IV. State of Globalization of Private Enterprises' R&D Activities

Question 1. Does your company now have R&D strongpoints overseas? (I.e., strongpoints where two or more researchers do R&D work. Includes overseas affiliated firms (50% or more financed). The same applies below.) Circle one of the numbers below that corresponds to your answer. For those firms that do have overseas strongpoints, fill in the number of strongpoints.

No.		
1.	Yes, we have. (Number of strongpoints:) Go to Questions 2-8
2.	No, we do not have. Go to Question 9.	

Question 2. We asked this question of enterprises that have R&D strongpoints overseas.

For the region(s) in which your company has set up (or plans to set up) an overseas strongpoint, circle one of the numbers below that corresponds to the time period during which your company set up, or plans to set up the strongpoint. (If there is more than one strongpoint in a region, the strongpoint that was set up most recently.)

Set up	United States	Western Europe	Other advanced countries	Asian NIEs	Other
Before 1969	1	1	1	1	1
1970~1979	2	2	2	2	2
1980~1984	3	3	3	3	3
1985~1991	4	4	4	4	4
Plan to in the future	5	5	5	5	5

Question 3. We asked this question of enterprises that have R&D strongpoints overseas.

For each region in which your company has set up overseas strongpoints, circle up to three numbers that correspond to your company's reasons for doing so. Of those items that you circled, put a double circle around the item for which there had already been results.

	[A]	[B]	[C]	[D]	[E]
1. To strengthen the technological power of production strongpoints (to strengthen production-research tieups).	1	1	1	1	1
2. R&D that copes with overseas needs, R&D for the purpose of improving products (to develop products that fir the area).	2	2	2	2	2
To search for the technology seeds (to secure basic research information).	3	3	3	3	3
4. To promote joint research with universities and firms in other countries.	4	4	4	4	4
5. To secure and to use the superb genius [i.e., talented researchers and engineers] overseas.	5	5	5	5	5
6. To provide stimulus to the entire company (e.g., conceptual changes).	6	6	6	6	6
7. We came to won R&D strongpoints through acquisitions of overseas firms.	7	7	7	7	7
8. For affiliated firms to make inroads overseas.	8	8	8	8	8
9. In order not to lag behind in the industrial world.	9	9	9	9	9
10. To make the name of our firm penetrate in order to facilitate future production and sales.	10	10	10	10	10
11. To improve the image of our firm in the country.	11	11	11	11	11
12. To avoid friction (governmental incentives). (In order to be recognized as a firm within the region, etc.).	12	12	12	12	12
13. Other reasons (explain in concrete terms).	13	13	13	13	13

[[]A] United States; [B] Western Europe; [C] Other advanced countries;

[[]D] Asian NIEs; [E] Other

Question 4. We asked this question of enterprises that have R&D strongpoints overseas.

What kind of research management problems did your company encounter overseas when it set up R&D strongpoints, and what kind of problems is your company encountering now or will it encounter in the future? Circle up to three numbers each for research strongpoints in Europe, the United States, and Asia.

		When set up		Now		In future	
	[A]	[B]	[A]	[B]	[A]	[B]	
1. The regulations and systems of the government there.							
 The treatment of intellectual property rights (dealing with the legal problems that are due to the legal system there). 							
3. Expenses are too high.							
4. The company's overall strategy on overseas expansion is inadequate.							
5. Cooperating and coming to an understanding with the main office in Japan or the overseas production site has not gone well.				·			
6. Ensuring R&D personnel overseas.							
7. Not enough talented people dispatched overseas by our company.							
8. High turnover in researchers, accumulation of technology is delayed.							
9. The efficient yield of R&D results.							
10. Research assessments and other such aspects of the research environment are different.							
11. The style of the research (the differences between project-ism and individualism).							
12. Criticism of technology being boxed in by Japanese firms.							
13. No problems.							
14. Other (explain in concrete terms).							

[A] Europe and United States; [B] Asia

Question 5. We asked this question of enterprises that have R&D strongpoints overseas.

What kind of effect do you expect that the establishment of R&D strongpoints in Europe and the U.S. will have on R&D strongpoints in Japan? Circle one of the numbers below that corresponds to your answer.

No.	
1.	Communications with Europe and the United States will be easier.
2.	Information about international seeds (technology seeds) will be acquired.
3.	It will raise the consciousness of the researchers.
4.	It will internationalize research management.
5.	We have no expectations.
6.	Other (explain in concrete terms).

Question 6. We asked this question of enterprises that have R&D strongpoints overseas.

What is the content of the research being done at your company's R&D strongpoints overseas? Circle up to two numbers each for the research content now and for that your company plans to do after five years.

	Now	After 5 years
 The development of products that correspond to the market in the area. 	1	1
2. Research for the purpose of improving productivity.	2	2
3. Research to clear the regulations there.	3	3
4. The development of what will become core technologies.	4	4
5. Basic research.	5	5
6. Other	6	6

Question 7. We asked this question of enterprises that have R&D strongpoints overseas.

Indicate the total number of researchers and their nationalities at all of your company's overseas R&D strongpoints by circling one number each for five years ago, now, and in five years.

<No. of researchers>

	5 years ago	Now	After 5 years
0	1	1	1
1~4 people	2	2	2
5 or more people	3	3	3
10 or more people	4	4	4
20 or more people	5	5	5
50 or more people	6	6	6
100 or more people	7	· 7	7
200 or more people	1 8 . 1941	8	8
500 or more people	9	9	9

<Nationalities>

	5 years ago	Now	After 5 years
Mainly non-Japanese	1	1	1
Mainly Japanese	2	2	2
Half and half	3	3	3

Question 8. We asked this question of enterprises that have R&D strongpoints overseas.

How many joint research efforts are your company's overseas R&D strongpoints carrying out with universities, firms, and government research institutes in foreign countries? Fill in the number of projects five years ago and now.

Five years ago: Now:

Question 9. We asked this question of enterprises that did not set up R&D strongpoints overseas (and those who do not plan to). Why did your company not do so? Circle one of the numbers below that corresponds to your answer.

No.	
1.	Our R&D strongpoints in Japan are sufficient, and there is no need to establish any overseas.
2.	R&D overseas is inefficient.
3.	Coping with the local systems is a lot of trouble.
4.	We cannot afford to set up strongpoints overseas.
5.	The risk is high.
6.	Other (explain in concrete terms).

Question 10. Circle one of the numbers below that corresponds to the results of your company's technology trade in FY90.

(Technology trade is when you supply to or receive from a foreign country technology such as patents, know-how, and technical guidance.)

	No.	
[1.	Both technology trade imports and exports.
ļŲ	2.	Only technology trade exports (value received).
	3.	Only technology trade imports (value paid out).
	4.	No technology trade.

We asked this question of those enterprises who answered that they had technology trade exports [i.e., answered 1. or 2. above].

To what extent did your company's overseas subsidiaries (overseas corporations in which your company invested 50% or more) and other overseas firms share in the amount of your technology trade exports? Circle one of the numbers below that corresponds to your answer.

No.	
1.	Subsidiaries only.
2.	Mostly subsidiaries.
3.	About the same degree.
4.	Mostly nonsubsidiaries.
5.	Only nonsubsidiaries.

Question 11. In your company's R&D strategy, what is the relative importance of the Asian NIEs? Circle two of the numbers below that correspond to your answers.

No.	
1.	Not important as R&D strongpoints. (We do not anticipate them becoming R&D strongpoints.)
2.	Product development strongpoints (including production support).
3.	R&D strongpoints for important technology.
4.	Basic research strongpoints.
5.	Strongpoints for joint research with research organizations, universities, and firms of Asian NIEs.
6.	Other (explain in concrete terms).

Question 12. This question is about contributions (that which pertains to R&D) made and research commissioned to universities overseas and in Japan. Circle one number each for overseas universities and for Japanese universities that corresponds to the total amount of contributions and fees for research commissioned to universities during FY1990. If the amount is more than 100 million yen, fill in the amount.

	Overseas universities	Japanese universities
1. Nothing at all	1	1
2. Less than ¥1 million.	2	2
3. More than ¥1 million.	3	3
4. More than ¥5 million.	4	4
5. More than ¥10 million.	5	5
6. More than ¥100 million.	6 (x ¥100 million)	6 (x ¥100 million)



Question 13. We asked this question of firms who contribute more and commission more research to overseas universities than to Japanese universities.

Why is that so? Circle two of the numbers below that correspond to your answers.

No.	
1.	We would like to contribute to Japanese universities, but the tax system prevents it.
2.	Overseas universities are at a higher level.
3.	Overseas, contributions are a social custom (a part of philanthropy).
4.	Because Japanese universities are not accustomed to industry-university cooperation.
5.	Other (explain in concrete terms).

Question 14. The ultimate image of your company's international expansion of R&D (globalization) is close to which of the choices given below?

Circle one of the numbers below that corresponds to your answer.

	I see the manager below that corresponds to your answer.
No.	
1.	Our R&D strongpoints in Japan, the United States, and Europe (Japan and the United States, Japan and Europe) each carry out R&D with originality.
2.	We have the core R&D functions in Japan; overseas, we only set up supplemental R&D functions so that we can cope with production technology and local needs.
3.	Although we have the core R&D functions in Japan and the supplemental R&D functions overseas, we aim for a composite sort of expansion that, for example, places high-originality R&D functions in a place such as the U.S. where there is a substantial market.
4.	It goes according to affiliated companies and clients. It is not an image of independence.
5.	We do not intend to internationally expand R&D (globalize).
6.	Other (explain in concrete terms).

V. State of Globalization of R&D Strongpoints in Japan

Question 1. How many non-Japanese researchers does your company employ in Japan? Fill in the numbers for three years ago and for now, according to nationality.

	3 years ago	Now
Americans		
Western Europeans		
Asians		
Other nationalities		

Question 2. Circle one of the numbers below that corresponds to the target percentage of overall researchers that non-Japanese researchers will account for in the future at your company's R&D strongpoints in Japan.

	III Japan,	
No.		
1.	0%	
2.	About 1%	
3.	About 2%	
4.	About 4%	
5.	About 6%	
6.	About 8%	
7.	About 10%	
8.	About 15%	
9.	20% or higher	
10.	Our company has not set a target.	

Question 3. Fill in the number of non-Japanese researchers your company currently has accepted as trainees, the number of non-Japanese researchers accepted as part of mutual dispatching, and the number of Japanese researchers your company has sent to foreign countries.

Accepted as trainees:	people
Accepted because of mutual dispatching:	people
Sent to foreign countries:	people

Question 4. We asked this question of enterprises who employ non-Japanese researchers at their R&D strongpoints in Japan.

What are the reasons for employing non-Japanese researchers at your R&D strongpoints in Japan? Circle two of the numbers below that correspond to your answer. Put a double circle around the item for which there have already been results.

No.	
1.	To develop new technology that is touched off by differences in concepts.
2.	To globalize research management (to introduce international points of view).
3.	To shore up the lack of talented personnel.
4.	Expectations from superb researchers that cannot be expected from Japanese researchers.
5.	To build the foundation for setting up overseas in the future.
6.	It is a company-wide policy that is also being followed in the research department.
7.	Other (explain in concrete terms).

Question 5. We asked this question of enterprises who employ non-Japanese researchers at their R&D strongpoints in Japan.

What are some of the problems encountered when employing non-Japanese researchers? Circle up to three of the numbers below that correspond to your answers.

NT-	
No.	
1.	Education of children.
2.	Securing a place of work for spouses.
3.	Acquiring a work visa.
4.	Securing housing.
5.	Language problems.
6.	Problems with customs and religious beliefs.
7.	Employment conditions (high wages, etc.).
8.	High turnover.
9.	Difficulties in accessing excellent researchers.
10.	There are differences in research style (project-ism, individualism).
11.	No problems.
12.	Other (explain in concrete forms).

Question 6. How many joint research projects are your company's R&D strongpoints in Japan carrying out with universities, firms, and government research institutes in foreign countries? Fill in the number of projects five years ago and now.

Five years ago: Now: Question 7. We asked this question of firms that are carrying out (or had carried out) joint research with overseas firms.

What are your reasons for carrying out joint research with overseas firms?

Circle up to two of the numbers below that correspond to your answers.

No.	
1.	Because it is difficult to do joint research with Japanese firms.
2.	Because there are no Japanese firms that have creative philosophy and distinctive technology in connection with the technology fields where joint research can be done.
3.	Because it is a foothold for our company's future globalization.
4.	In order to draw up common product standards.
5.	In order to share in the development of new products.
6.	Objectives other than joint research itself.
7.	Other (explain in concrete terms).

Question 8. Overseas there are several examples of private firms operating laboratories such as Bell Labs that carry out very leading-edge research with a broad-minded outlook towards accepting outside researchers. The laboratories have played a leading role in the history of S&T.

What does your company think about setting up such a laboratory in Japan? Circle one of the numbers below that corresponds to your answer.

No.	
1.	That kind of laboratory (department) is necessary, and we are already setting one up.
2.	That kind of laboratory (department) is necessary, and we are planning to set one up.
3.	Although we recognize the need for such a laboratory, our company does not think about setting one up.
4.	Bringing such a laboratory into existence in Japan's research climate would be difficult.
5.	A place like Bell Labs is an exception; even from a worldwide view, firms do not need such laboratories.
6.	Other.

Question 9. We inquired about the publication of the results in your company's basic research department in comparison with U.S. and European firms that are in the same kind of industry. Circle one number each, for now and in the future.

	Now	Future
1. We publish more than U.S.and European firms	1	1
2. We publish the same as U.S.and European firms.	2	2
3. We do not publish as much as U.S. and European firms.	3	3
4. We do not do basic research.	4	4
5. Other.	5	5

Question 10. As future goals for your company's R&D strongpoints in Japan, with respect to the following items does your company consider adopting the same or similar rules as those employed at your company's overseas R&D strongpoints or at overseas private firms' R&D strongpoints?

For each of the items below, indicate whether or not your company will adopt rules that have to do with that item by circling one of the numbers.

	Will adopt rules	Will not adopt rules	Other
Personnel matters, such as the employment and treatment of researchers.	1	2	3
Form of service.	1	2	3
Handling of research results.	1	2	3
Joint research with the outside.	1	2	3
Uniformity in the language(s) used (e.g., side-by-side English text).	1	2	3
Contributions by means of donations, etc.	1	2	3

VI. Making Rules To Facilitate the Activities of Private Firms

Question 1. Circle one number for each region that corresponds to your company's situation with respect to troubles with overseas firms involving intellectual property rights.

	United States	Western Europe	Asian NIEs	Other
Increasing	·· 1	1	1	1
No change	2	2	2	2
Decreasing	3	3	3	3

Question 2. What sort of S&T-related problems are there now and will there be in the future in your company's relationship with the United States?

Circle up to three numbers each for now and for the future.

The specific removes carried for now and for the	T	T
	Now	Future
 Problems relating to intellectual property rights. 	1	1 .
2. Problems relating to export control laws.	2	2
3. Problems relating to antitrust laws.	3	3
4. Criticism that Japan gets a free ride on basic research results.	4	4
5. Criticism that Japanese firms in the United States keep their brilliant people closed in.	5	5
6. The growing difficulty in introducing technology.	6	6
7. The growing difficulty in accessing S&T information.	7	7
8. Existence of large technological gaps (with Japan in the superior position).	8	8
9. Ways of thinking about social contributions (donations, etc.).	9	9
10. No problems.	10	10
11. Our company has no connection with the United States.	11	11
12. Other	12	12

Question 3. In the R&D activities in which Japanese firms take an active part internationally, for which items would it be more desirable if there were a common, worldwide base?

Circle up to two numbers that correspond to your answers.

No.	
1.	An intellectual property rights system.
2.	A taxation system for R&D activities.
3.	Environmental regulations.
4.	Product liability.
5.	Regulations on the transfer of chemical weapons technology.
6.	Regulations with respect to relations with strife-torn countries.
7.	Product standards.
8.	The treatment of foreign firms in connection with subsidies and loans from each country's government.
9.	Local contributions by publication of basic research results.
10.	Nothing in particular.
11.	Other (explain in concrete terms).

Question 4. Is there any R&D (technology development) for global environmental problems being done in your company?

Circle one of the numbers below that corresponds to your answer.

 No.	
 1.	We are doing such R&D.
2.	We are investigating such R&D.
3.	We are not doing such R&D.

→ We ask the next question of those firms that answered that they are doing or investigating R&D for global environmental problems.

We asked about how your company's R&D relates to the global environmental policies being implemented by the governments of other countries. Circle one of the numbers below that corresponds to your answer.

No.	
1.	Technology that is expected to be put into effect by ODA (official development assistance) and funds from local governments overseas (afforestation of deserts by new methods, cleaning up marine pollution, etc.).
2.	The development of technology for coping with the government restrictions of each country that are expected in the future (regulations on carbon dioxide emissions, prohibitions on the use of CFCs, etc.).
3.	Without any direct relation to government policies, the development of technology that will contribute to the solution of environmental problems as a result of the effective utilization of tropical forests, more efficient recycling, etc.).
4.	Other.

Question 5. How do you think the state of affairs surrounding the activities of firms should change in order for firms to better contribute, whether directly or indirectly, towards solving global environmental problems by means of R&D?

Circle one of number each for the situation in Japan and the international situation.

The State of Affairs in Japan

No.	
1.	Rethinking Japan's legal regulations and other such systems.
2.	An expansion of the nation's support for R&D, e.g., subsidies, a tax-deduction system.
3.	National leadership such as in the establishment of research partnerships.
4.	Imparting the right knowledge to the citizens of Japan and raising their consciousness.
5.	Other.
6.	The situation as it is now is fine.

The International State of Affairs

No.	
1.	Because legal regulations and other such systems differ depending on the country, the standardization of those systems.
2.	The smooth promotion of international joint research.
3.	Leadership from the advanced countries (setting targets, promoting concrete policies, etc.).
4.	Developing countries' understanding towards global environmental problems.
5.	Mutual understanding with respect to the differences depending on the country in the recognition of the problems.
6.	Other
7.	The situation as it is now is fine.

Thank you for your cooperation.

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